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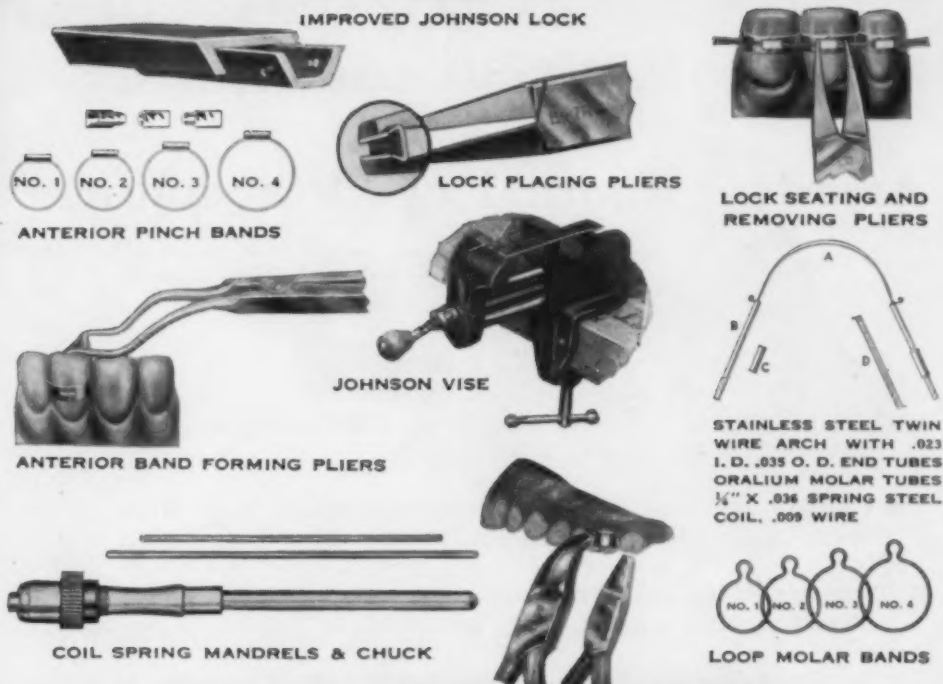
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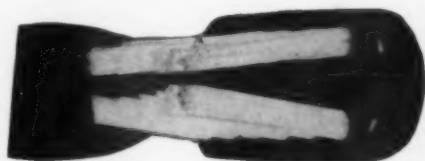


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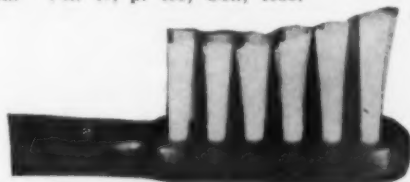
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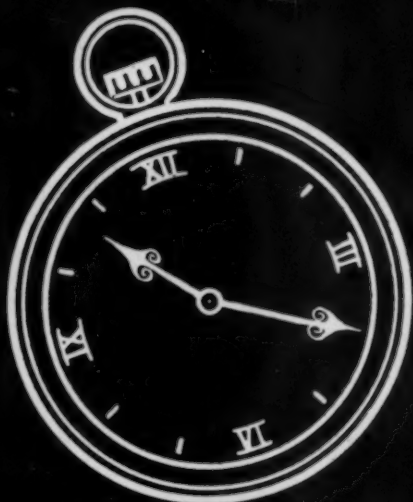
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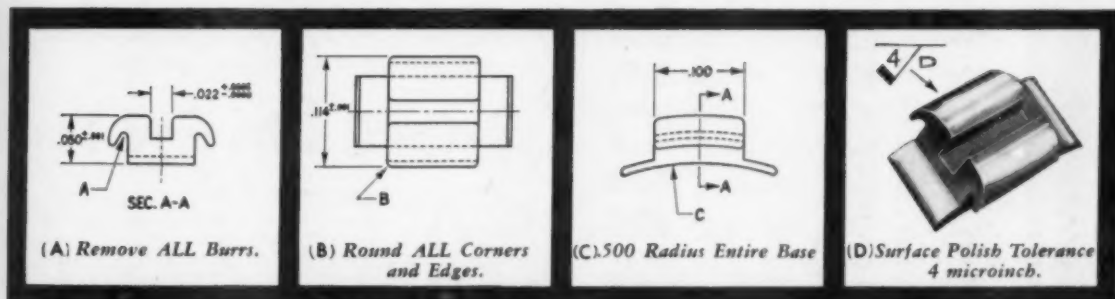
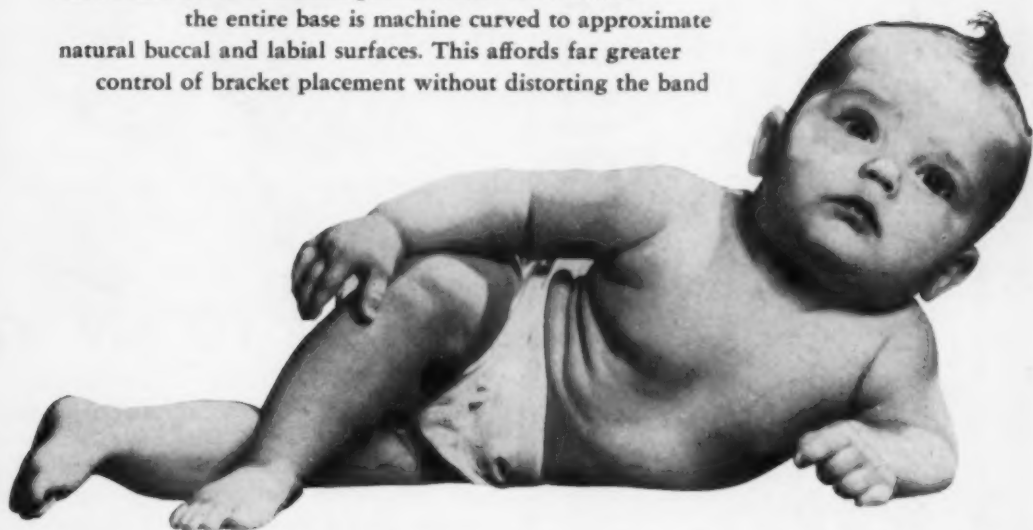
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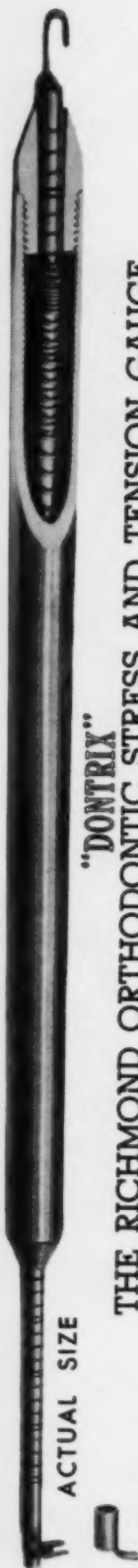
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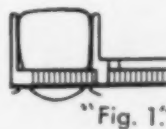
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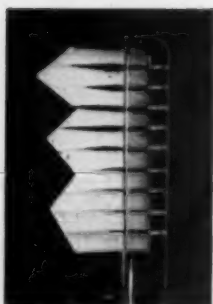
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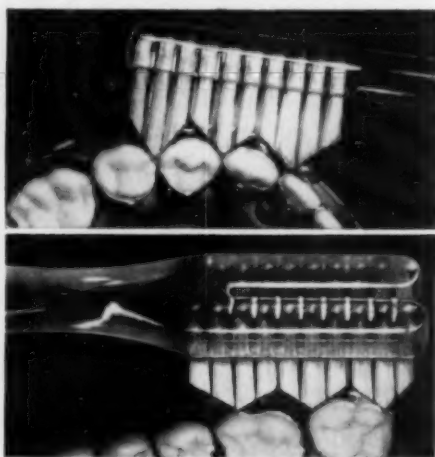
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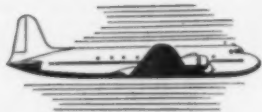
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American Journal
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VOL. 41

JANUARY, 1955

No. 1

Original Articles

PRESIDENT'S ADDRESS, NORTHEASTERN SOCIETY OF
ORTHODONTISTS

J. A. SALZMANN, D.D.S., NEW YORK, N. Y.

I SHALL take this opportunity to attempt a brief orientation of orthodontics as it exists today and to present a few recommendations for your consideration in the hope that these may be helpful in maintaining and adding to the contributions which our Society, a component of the American Association of Orthodontists, has made in the past to orthodontic progress and to the health and welfare of the children of our country.

Orthodontics today is an integral part of public health. It is no longer a service for the few who can afford to pay for it, and its benefits are being sought by an ever-increasing number. While formerly appreciated by the public largely for its cosmetic value, orthodontic care is now recognized as an important factor in the personality adjustment of children with dentofacial abnormalities.

The American Public Health Association, the largest group concerned with public health, has singled out orthodontics of all the branches of dentistry for special consideration. Federal, state, and local government public health agencies are showing increasing concern with the provision of orthodontic care, even where they are not actually conducting orthodontic programs.

The American Association of Orthodontists, recognizing its responsibility as a health service, appointed a Public Health Committee four years ago.

Presented at the Annual Meeting of the Northeastern Society of Orthodontists, New York, N. Y., March 8, 1954.

This committee is cooperating with various public health bodies in attempts to bring orthodontic care to more and more children who have not received it in the past.

Recently labor unions and other groups have been making attempts to organize prepaid orthodontic plans along with proposals for medical and dental care. If these efforts are not organized on a factual basis, in the end they will prove detrimental to the very children whom they are supposed to benefit. Our own Society has been cooperating with state and local public health groups over the past ten years. Our Public and Professional Relations Committee is ready to assist members in dealing with questions pertaining to orthodontic care on a public health plane.

Additional evidence of the growing interest and increasing demand for orthodontic service on the part of the public is to be seen in the many articles on orthodontics appearing in the public press. An article which appeared in the January issue of *Good Housekeeping* has been pronounced by orthodontists practicing in various parts of the country as being a fair presentation of the facts. It was only through a fortuitous circumstance that Dr. Lowrie Porter learned about this article before it was published. Dr. Porter enlisted the aid of Dr. Joseph D. Eby and myself. Together we were able to discuss statements contained in the original version of the article with the editor of *Good Housekeeping*, whom we found to be a truly public spirited man interested in presenting facts to his readers.

The American Public Health Association is preparing a series of statements intended to guide public health authorities in setting up health service programs for children on a community basis. A separate statement on orthodontic public health programs has been included. In the preparation of the "Statement on Orthodontics" the A.P.H.A. enlisted the aid of the American Association of Orthodontists. The A.A.O., through its Public Health Committee with the aid of a group of advisers who are active in the affairs of the A.A.O., held a number of sessions at its meetings at Washington, D. C., St. Louis, and Dallas, Texas. It is with great satisfaction that I am able to inform you that practically all the suggestions and recommendations of the A.A.O. have been accepted and incorporated in the "Statement on Orthodontics" of the American Public Health Association.

At its past meeting in Dallas, Texas, the A.A.O. voted to set up guiding principles for orthodontists who are asked to participate in public health or in private plans for the provision of orthodontic care on a prepaid basis, where the fee to the orthodontist is not paid directly by the patient, but rather by a third party who acts as an intermediary for the patient.

All of the foregoing may not be quite as meaningful to those of us who are busy with our patients in our respective offices. However, as all of us can read in our newspapers, our President and the Congress are not relenting their efforts for the expansion of health service. We should not wait until we are confronted with methods of practice which would tend to disturb our present

patient relationship before we begin to interest ourselves in public health questions. What is true of the national scene holds true also, albeit on a more circumscribed scale, in our local communities.

To come now to the problems peculiar to our own Northeastern Society and its members, there appears to me to be a need for reconsideration of our method of operation in the matter of the types of membership, the kind of scientific sessions we are to hold in the future, our public and professional relations, and the work of the Society through its committees.

We shall have to give more serious thought to the practice of endorsing applicants for membership without definitely establishing their professional competence in addition to their ethical and professional practice. We must decide now whether we are to be merely a dues paying group of whether membership in the Northeastern Society is to carry with it the stamp of ethical and professional competence. It is my conviction that the Northeastern at all times should consider itself as an organization of practitioners in the exclusive practice of orthodontics. At the same time, we should always be ready and willing to assist groups who are seriously interested in orthodontics, even if they do not devote their entire practice to it. These groups now exist. They are an established fact. We owe it to orthodontics to aid these groups.

Our public relations could be improved materially if our Society set up a health education exhibit to be included in exhibits at meetings of health and educational bodies meeting in New York City. This is one of the most popular convention cities in the entire country. The information such an exhibit could impart would add greatly to the proper understanding of orthodontics as a health service and orthodontists as a specialty group.

* Scientific sessions devoted to lengthy essays are a thing of the past. While published articles can be read by the reader at his leisure and in his own good time, the spoken word must be "caught in flight," as it were. The peculiarities of the human mind and variation of individual interests is such that the information contained in most scientific papers is only too frequently lost on the audience.

I recommend that we appoint a committee to look into the possibility of presenting programs to include papers of ten to twenty minutes' duration, with all statistical material and technical procedures mimeographed by the Society and given to the audience in advance. We then would not be in the position of expecting the audience to digest on first hearing work on which the essayist has spent many months or even years to perfect. Papers then could be published in extenso, setting forth all the information actually required for proper study and understanding. Whenever possible, demonstration clinics should supplement essays. Clinics should be organized to afford the opportunity to as many members as possible to attend and discuss questions with the clinicians.

At this time, I wish to thank all the committees for their enthusiastic support during my administration. To Dr. John J. Dolce, chairman of the committee who prepared our scientific programs and arranged our meetings, I owe

special thanks. Thanks are due also to our secretary, Dr. Oscar Jacobson, and to our excellent executive secretary, Mrs. Augusta Grimm.

In conclusion, may I say that being president of an organization such as ours is a great privilege. Above all, it is a practical demonstration of the working of democracy, where the right of the individual is vested in the group. I shall take my place among you, therefore, with pride in the knowledge that I am one of you.

THE CLINICAL SIGNIFICANCE OF TISSUE CHANGES INCIDENTAL TO TOOTH MOVEMENT

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IN 1953, at the Dallas meeting of the American Association of Orthodontists, there was a symposium in which five case reports were presented using different types of appliances and techniques in the treatment of a typical distocclusion case.¹ This symposium was designed to demonstrate the fact that the choice of appliance is not what determines the success or failure in orthodontic therapy. Yet, if we view the orthodontic scene objectively, we find today that the profession is divided into groups, distinguished from one another primarily by the appliance that each uses. So much emphasis is placed on the differences that we have lost sight of our common ground.

At the same meeting, in his Presidential Address, Bell² stated:

We seem to have lost sight of the fact that it doesn't make any difference what material we use, what appliance we use, what technique we use, as long as our patients have the benefit of conscientious orthodontic care as our contribution to their other health services.

We also seem more prone to criticize our colleagues than in past years. In my opinion, it is beneath the dignity of orthodontics and orthodontists to criticize the methods used by our colleagues. Such criticism is, after all, a criticism of orthodontics as a whole. The present open bickering concerning materials, appliances, and techniques has decreased the esteem in which orthodontics has always been held. We are making ourselves ludicrous in the eyes of our fellow dentists and the public; and nothing so quickly destroys prestige as derisive laughter!

In the symposium to which reference has already been made, there was positive evidence to show that very splendid results can be achieved with any appliance if the operator uses it correctly. "Each operator's particular skill and early association with orthodontics will be major determining factors in the choice of appliances."³ "Basically, appliances are used to exert a force on the teeth and this force is expected to produce certain changes."³

If we understand the changes incidental to tooth movement, it becomes possible for us to adjust our appliances in a manner which will produce the necessary changes with the minimum amount of injury to the tissues involved. Furthermore, if we understand what these changes are, it will become possible for us to know something about our limitations in treatment. It is obvious,

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therefore, that a knowledge of the tissue changes incidental to tooth movement is essential to the proper conduct of an orthodontic practice. It is not a subject designed for theory alone, but a subject of great practical importance.

In the discussion of tissue changes incidental to tooth movement, no new material will be referred to. We shall merely review the material which has been presented in the past by many competent and skilled workers in the field of research. In so doing, it is hoped that we can establish a basis for the interpretation of these findings that will be of inestimable value in the development of a rationale that will emphasize the need for the application of the biologic principles to clinical practice.

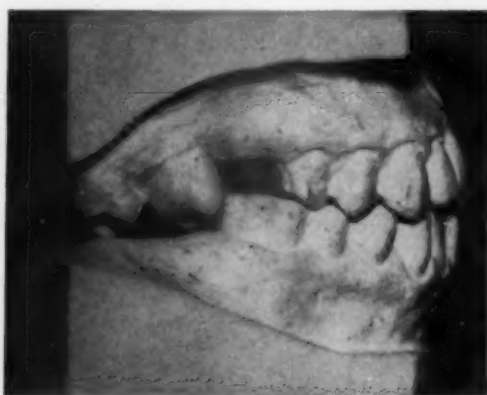


Fig. 14.—The upper right second and third permanent molars and the lower right first permanent molar have passed the line of occlusion. This is the result of the vertical growth of bone structure which has resulted because of the loss of the opposing teeth. Deprived of functional pressure, bone grows in the direction of diminished resistance and carries these teeth into supraversion.

At present there is considerable confusion in the minds of many of us as to the immediate changes induced by the application of forces through the medium of orthodontic appliances. The reason for this confusion dates back primarily to the introduction of two misconceptions. The first of these is Wolff's law, which states that bone grows in response to the functional demand for it. The second is the concept evolved by Angle in 1908, namely, that gentle forces stimulate bone growth. It is because of this latter concept that orthodontic appliances are erroneously defined as appliances which stimulate the growth of bone.

Let us examine each of these concepts, not only to determine the reasons for the misconception, but also to clarify them so that we might employ the principles evolved to greater advantage.

When Wolff enunciated his law of bone growth in 1892, he did so because he had observed the intimate interrelationship between the existence of bone and physiologic need for it. Hence, he stated that the bone grew in response to the need for it and, since that need was to support pressure, it was assumed by him and a host of others that bone grows as a result of the application of pressure.

As we examine the characteristics of bone growth, we find that bone grows only because of the inherent impulse of living tissues to grow. It has even been possible to grow bone in vitro in a test tube. The experiments of Carrell in connection with the growth of a chick heart, in vitro, demonstrate this characteristic of other living tissues to grow without any functional stimulation. Clinically, we see the augmented growth of alveolar bone when teeth are deprived of occlusal contact (Fig. 1A). Microscopic evidence reveals the development of an osteoid tissue at the site of traction on the periodontal fibers. This osteoid tissue grows so rapidly that the width of the periodontal



Fig. 1B.—The development of osteoid tissue at the site of tension on the fibers of the periodontal membrane. This is another indication of the growth of bone into an area of diminished resistance. Direction of movement is indicated by the arrow. *oB*, Old bone; *nB*, new bone; *J*, demarcation line between old and new bone; *Ps*, periodontal space; *C*, cementum; *D*, dentine. (Magnification, $\times 85$.) (From Oppenheim: *Angle Orthodontist* 3: 175, 1935.)

space, at the site of traction, is maintained (Fig. 1B). The splinting of a fracture deprives the bone of functional pressure, but this absence of pressure permits the growth of bone and results in repair. In other words, where there is less pressure there is more growth. The converse of this is also true: where there is more pressure there is less growth. We note this in cases of malocclusion associated with a marked hypertonicity of the musculature. In those severe cases of malocclusion referred to as Angle's Class II, Division 2, we note a marked deficiency of the vertical growth of alveolar bone in the



Fig. 2A.—Occlusal view of bite plate. Note that the anterior shelf is flat in contrast to the inclined plane on bite planes.



Fig. 2B.—When the bite plate is in position, it prevents the posterior teeth from coming into occlusal contact. The area of diminished resistance thus created results in the vertical growth of bone structure which carries the upper molars and premolars downward and the lower molars and premolars upward until they have gained occlusal contact.

molar and premolar regions because of the greater pressure exerted on the bone through the broad occlusal aspects of the molars and premolars. As the maxillary and mandibular anterior teeth are tipped lingually by the orbicularis oris muscle, they escape occlusal impact, and therefore vertical growth continues relatively more normally in this region. When we wish to encourage greater growth of bone in the molar and premolar regions, in these cases, we insert a bite plate (Fig. 2A). The bite plate deprives these teeth of occlusal impact (Fig. 2B) and, as a result of the diminished functional pressure, there is an increase in the volume of alveolar bone.⁴ Hence, we see that there is a complete contradiction of Wolff's law; that actually bone grows as a result of the inherent impulse of living tissues to grow, and that bone is stimulated to greater volumetric growth by the creation of areas of lessened resistance. In this instance only can we say that the orthodontic appliance stimulated bone growth; and then it was not through the application of pressure, but rather because of the relief from pressure.



Fig. 3.—The upper first molars in frontal section. A, Nonfunctioning side; B, functioning side. (From Oppenheim [after Kellner], *Angle Orthodontist* 5: 175, 1935.)

Functional pressure, however, does play an important part in the life of bone. If we examine the bone structure supporting teeth that have been deprived of pressure, we find that it is relatively more porous. The bone structure supporting teeth that have been subjected to greater pressure is much denser (Fig. 3). There is a definite correlation between the density of bone and the pressure which it receives in function. Now we can see clearly the role of functional pressure:

1. The form of bone is in major part determined by pressure, because there is more growth where there is less pressure and less growth where there is more pressure, and
2. Pressure exerts a trophic influence; functional pressure maintains bone and the absence of it causes the bone to be hollowed out.

Now, let us examine the concept introduced by Angle in 1908. At that time, when presenting a paper entitled "Bone Growing,"⁵ he stated:

"Doubtless you will be surprised at the title of my paper, and you will ask what bone-growing has to do with orthodontia. My answer is that it is probably the most important problem in orthodontic treatment. Indeed, most of our successes in treatment depend on our success in bone-growing, and if the orthodontist does not succeed in growing bone he will find, in time, that the teeth he has moved so dextrously and satisfactorily have all returned to, or very nearly to, their original positions."

"The writer believes that such a gentle, harmless stimulus is thus given as will accelerate cellular activity and greatly lessen the time usually necessary for bone-growth and retention, besides effecting final results in bone development which would otherwise be impossible when the patient is nearing maturity."

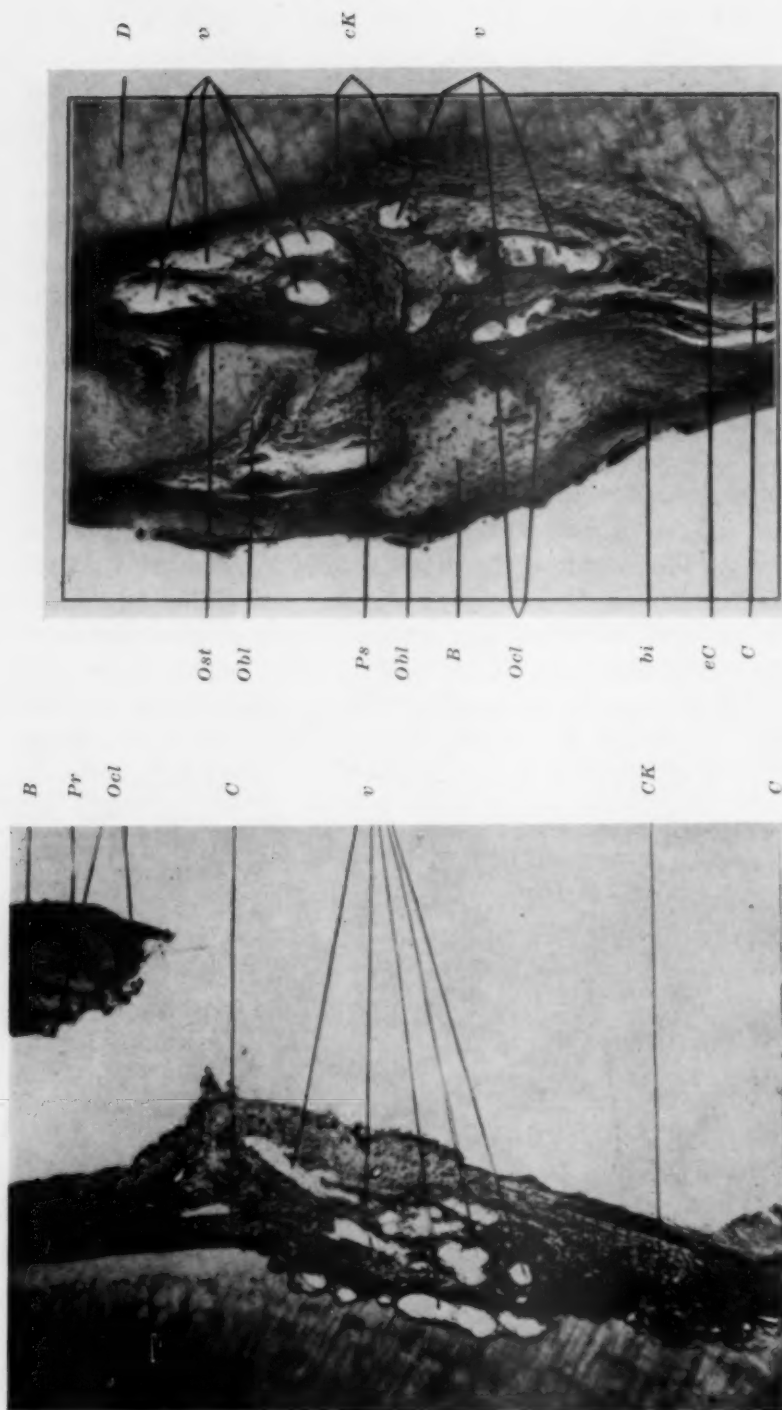
Microscopic evidence of the effects of pressure clearly indicates that there is no justification for this assumption. The factor which led him to this conclusion can be traced to the change in the degree of force which was employed before and after 1908. This change in the concept of the degree of force to be employed was based entirely on the clinical finding that better results were obtained as a result of the gentler forces exerted by the working retainer. It was not based on a knowledge of the biology of bone. Broadly speaking, this might be referred to as the beginning of the biologic era in orthodontics.

One cannot point to any specific date to indicate the beginning of a biologic concept in orthodontics because, even in the earliest stage of the practice of orthodontics, there was always an awareness of the fact that living tissue was being manipulated. Clinical manifestations such as soreness and looseness of the teeth were often referred to and this in itself constitutes an awareness of the reaction of living structures to applied forces. However, these references hardly indicate any implication to the biologic concept as it is referred to today. When forces were applied, it was commonly believed that the force was for the purpose of bending bone and that perhaps some biologic changes may be occurring at the same time,⁶ but precisely what happened when forces were applied to the teeth was entirely a matter of conjecture. Research to determine what actually happened was relatively slow and not many contributed to this important phase of orthodontics. At first the work was done on animals only and the difficulty encountered in duplicating the conditions in the manipulation of appliances, as practiced clinically, tended to somewhat confuse the picture. It was not until 1935 that extensive research was reported, showing the effects of orthodontic manipulation on the parodontium of human beings.⁷ Oppenheim's report on the microscopic findings under varied conditions was the greatest contribution made in this field. The correlation between these findings and research on the behavior of bone, both in the process of normal growth and in response to injury, makes it possible to understand the changes that will be induced in the parodontium by any modification of the forces applied to teeth. Empirical procedures to determine what will occur when orthodontic appliances are used are no longer

required or justified. All that is now necessary to predict what will occur when a force is applied to bone is to know (1) the length of time that it will operate, (2) the direction of the force, and (3) the distance through which it will be effective.

It is important to note the difference in the nature of forces exerted by muscles and orthodontic appliances. In so doing, we shall make a start in the discussion which will enable us to determine what are the meanings of the terms *intermittent* and *constant*, *gentle* and *excessive*, as they apply to forces, whether exerted by muscles or orthodontic appliances. Muscles, through their tendons, and ligaments, through the action of muscles which create a pull on them, exert their force directly on bone structure through the insertion of the fibers which are calcified in the bone. Thus, when there is a pull on a tendon or a ligament, there is no action on an intermediate structure.⁸ When we exert a pressure force on bone with an orthodontic appliance, we do not act directly on the bone at the site of pressure, but actually exert that force on the periodontal membrane. It is compressed between the tooth and the bone as the periodontal width is narrowed. In consequence of this compression, the circulation in the periodontal membrane is slowed, resulting in stasis. This stasis, which is merely a retardation of the circulation, results in a lowering of the pH of the blood at the site of compression. Murray⁹ noted that "vascular changes probably induce local tissue pH changes which may strongly influence precipitation of calcium salts from solution or colloid combination or ferment activities on large radicles of organic calcium salts." This relative increase in the acidity may be due to the accumulation of the by-products of metabolism as the blood is retarded in its progress to the lungs where it is normally purified and it may be, in part, the result of the process of inflammation. The lowered pH of the blood is followed by resorption of both bone and cementum adjacent to the site of injury. With the resorption of the bone and cementum, the periodontal space is widened and the circulation is no longer hampered. The calcium, which is liberated by the solution of both bone and cementum, is held locally at the site by the fibrinogen, hyaline, and collagen fibers which have an affinity for calcium. The collagen fibers are freed by the solution of both bone and cementum and the fibrinogen fibers are made available by the breaking down of red blood cells at the site of trauma. When the circulation returns to normal, the pH of the blood is raised to normal, releasing the calcium excess, and the process of repair is initiated.

If we examine a microscopic section, we always see the evidence of this resorption at the site of compression associated with the stasis or, as Oppenheim referred to it, the angioma-like mass (Fig. 4). Oppenheim⁷ was apparently surprised to find that the width of the resorption exceeded the distance through which the tooth had been moved. He referred to this phenomenon when he stated, "Perhaps this greater width of the periodontal space on the pressure side is to be attributed to the frequent observation, also made on the material at hand, that the once initiated resorption overshoots the mark (Gottlieb). It may be that this represents a further remedy of nature for bringing about a quicker and longer lasting reduction of pressure."



4A.

Fig. 4A.—If the reduction in the height of the buccal alveolar wall was not produced artificially, then the alveolar border was resorbed by the pressure, for originally it must have reached at least to the gingival border of the cementum resorption, if not still further, in order to make possible the appearance of the cementum resorption at the area where it is seen. *B*, Bone; *Ocl*, osteoclasts; *Pr*, periosteum; *C*, cementum; *CK*, cementoclasts; *v*, vessels. (Magnification used: *Angle Orthodontist* 5: 169, 1935.)

Fig. 4B.—Girl of 15. Appliances used: expansion arch (*Angle*), 0.8 mm. thick. Extent of movement: 1 mm. of parallel expansion from canine to molar. Treatment was begun Nov. 24, 1931, using common wire ligatures. The tooth was ligated to contact with the arch wire which stood off 1 mm. Every fortnight the ligature was changed. Three days before the extraction (Jan. 15, 1932) the last change of ligature was made. The distance between 4/4 at the end of the treatment was 2 mm. greater than at the beginning. The whole time of treatment was fifty-two days—seven and one-half weeks of intermittent elastic force. *B*, Bone; *Ps*, periosteum; *Ost*, osteoblasts; *Ocl*, osteoclasts; *v*, vessels; *bi*, fibers of connective tissue between bone and cementum. (Magnification, *Angle Orthodontist* 5: 174, 1935.)

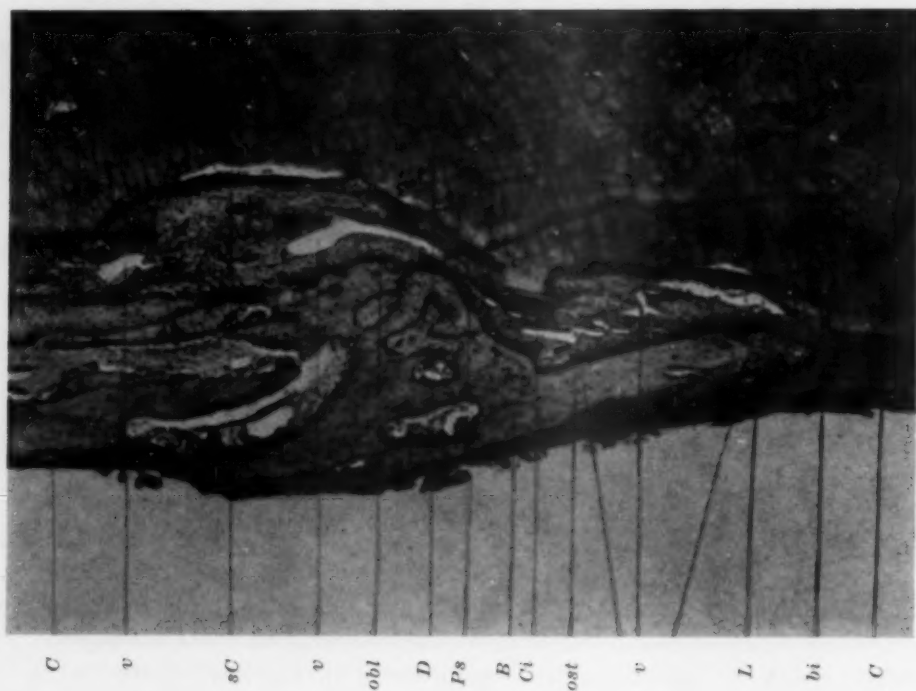
4B.

Strang¹⁰ was likewise affected by this finding, for he refers to it as a surprise. He said, "The periodontal space is wider, by actual measurement, on the side of pressure than on the side of traction. This is a surprising discovery as it has always been thought that it was just the reverse. It may possibly be explained by the fact that the resorption taking place to permit tooth movement, overdoes itself. This is Gottlieb's contention."

If we take into consideration the characteristics of the tissues on which we are operating, we are no longer surprised by this phenomenon, but actually anticipate it. It has always been said that bone is the most plastic of all living tissues. Actually, bone is not plastic, but rather elastic, in the physical sense. Only in the biologic sense is bone plastic. It is its rapid response to its environment that is referred to when we speak of its plasticity. Thus, we find that its resorption is brought about by stasis and this resorptive process goes on at a more rapid pace than the reparative process in the soft tissues of the periodontium. This more rapid response of bone to changes in its environment creates another phenomenon which is attributable to the very great plasticity of bone. When we take into consideration the more plastic nature of bone, some other of the microscopic findings cease to be startling phenomena but actually begin to have a pattern of behavior which we understand. Thus, Oppenheim⁷ refers to the more rapid growth of bone than that which prevails in cementum. "We are already familiar with the generally known fact that nature makes every effort to narrow to an adequately normal width, as quickly as possible, the periodontal space if, by some reason, it has enlarged too much. In addition to filling this space by the normal process of osteoid formation the result can be accelerated by a forward vaulting of the bone towards the surface-like extended defects of the tooth, or by a hypertrophic cementum formation." (Fig. 5.)

If we examine both bone and cementum microscopically, we find that they are almost alike, except for the fact that bone contains Haversian canals, but cementum does not. In these Haversian canals, we find small blood vessels. In other words, bone has two sources of blood supply: its periosteum and its own blood supply. Cementum has only that blood supply which is furnished by its periodontal membrane. Black¹¹ pointed out this difference as far back as 1920. The bone is resorbed faster and heals faster than cementum because of this dual source of blood supply. Were it not for the fact that bone resorbs faster than cementum, tooth movement would not be possible.

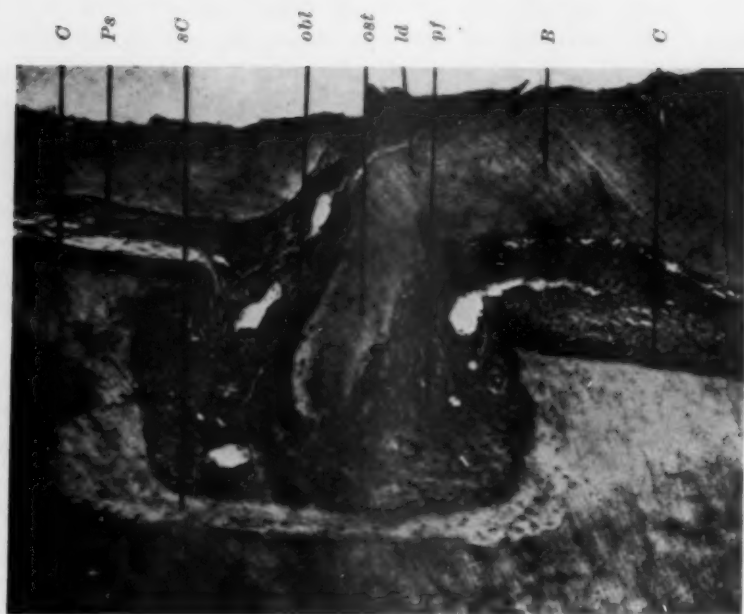
If a force is exerted on a tooth to move it through a distance greater than the width of the periodontal membrane, and if that force is great enough to crush the periodontal membrane, the circulation is cut off and the periodontal membrane is destroyed at that site. The pressure will cause some bending at the alveolar crest and this will result in stasis in the Haversian canals with the resultant resorption of the bone and the lowering of the alveolar crest. In this instance, there will be no cementum resorption because there is no stasis adjacent to the cementum, the periodontal membrane having been destroyed. But, when the periodontal membrane is destroyed, there can be no regeneration of bone at that site. As the tooth leans against the alveolar crest, how-



5A.

Fig. 5A.—Direction of movement is indicated by the arrow. *B*, Bone; *P8*, periodontal space; *C*, cementum; *Ci*, isle of cementum between the two resorptions; *sC*, secondary cementum; *L*, alveolar crest, bordered by lacunae; *ost*, osteoid; *obl*, osteoblasts; *v*, vessels; *D*, dentine; *bi*, fibers of connective tissue between bone and tooth. Note the vaulting of the bone structure in the resorbed area. (Magnification, $\times 44$; reduced $\frac{1}{4}$.) (From Oppenheim: *Angle Orthodontist* 5: 184, 1935.)

Fig. 5B.—Note the fingerlike projection of bone as it extends into a narrow, deep resorption in the cementum. *B*, Bone; *ost*, projection of newly formed bone into the cementum resorption; *ld*, demarcation line between old bone and osteoid, which is beset by a dense osteoblastic layer (*obl*); *C*, cementum; *sC*, secondary cementum; *P8*, periodontal space; *pf*, periodontal fibers already inserted into secondary cementum and osteoid. (Magnification, $\times 85$.) (From Oppenheim: *Angle Orthodontist* 5: 245, 1935.)



5B.

ever, a fulcrum is created and the crown of the tooth moves in one direction and the apex in the opposite direction. This results in the development of stasis in the apical third of the tooth in the direction in which the apex has moved. This stasis causes the resorption of both bone and cementum at the site of compression of the periodontal membrane. If the tooth is then stabilized by the orthodontic appliance, without further application of force, repair

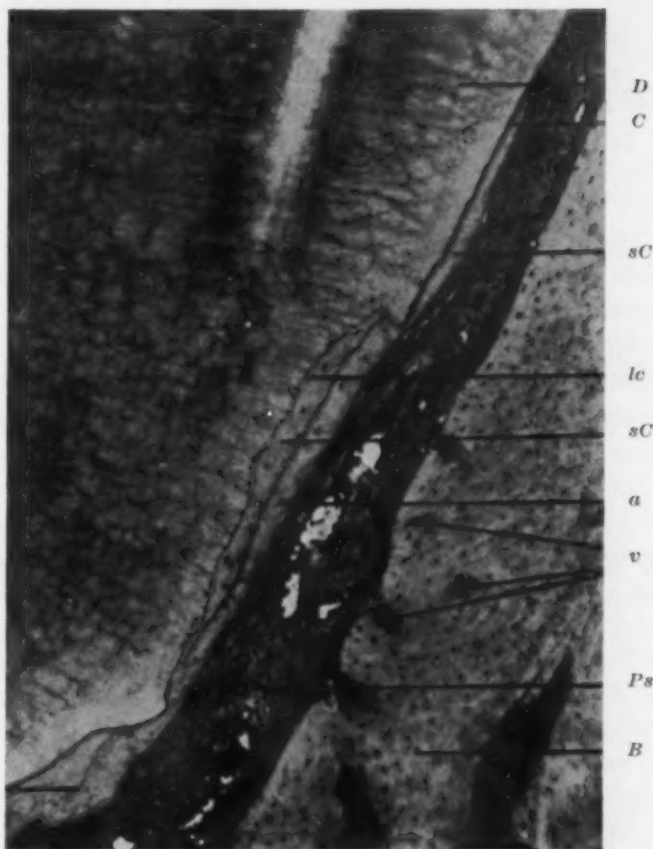


Fig. 5C.—Note the vaulting of the cementum exostosis (hypercementosis) in the resorbed area. *B*, Bone; *Ps*, periodontal space; *v*, vessels in the bone; *C*, cementum; *a'*, cementum resorption formed during the active movement; *lc*, lacunary bordered surface of dentine, on which the secondary cementum (*sC*) was deposited in two distinct layers; *sC*, the exaggeratedly formed secondary cementum overlying the primary cementum (*C*); *Ex*, cementum exostosis. (Magnification, $\times 40$; reduced $\frac{1}{4}$.) (From Oppenheim: *Angle Orthodontist* 5: 242, 1935.)

will take place. The apical resorption will be repaired so that the root will again be normal, but the alveolar crest will have been permanently lowered. If this procedure is repeated, the tooth will have been moved into the desired position without root resorption, but with cumulative destruction of alveolar bone. If this same type of force is renewed without the proper intervals of rest, there will not be sufficient repair of the resorptions of the tooth in the apical area and the resultant cumulative resorptions of cementum and dentine will result in root resorption. Hence, we find that in these cases we have root resorption and a lowering of the alveolar crest.

The teeth thus affected are no longer as capable as normal teeth of withstanding periodontal disease, as the support has been reduced both at the apical end and in the cervical region. In addition, the clinical crown has been lengthened to the degree that the alveolar crest has been lowered.

If the tooth is moved through a distance less than the width of the periodontal membrane, stasis will result only at the alveolar crest, because in this instance a fulcrum will not have been created at the alveolar crest. Hence, there will be resorption of cementum and alveolar bone at the site of compression of the periodontal membrane without a destruction of the periodontal membrane. If the force is reapplied before there is complete repair, the alveolar crest will be subjected to cumulative resorption with a permanent lowering of the alveolar crest, but without root resorption. This tooth likewise will be less capable of withstanding the onset of periodontal disease because of the increased length of the clinical crown, but it will be less affected than the tooth which had been moved through a distance greater than the width of the periodontal membrane, because the tooth would not have suffered from root resorption and, therefore, the support of the tooth would have been reduced only at the cervical end.

This clearly indicates (1) the necessity of moving a tooth through a distance less than the width of the periodontal membrane, and (2) the necessity of splinting the teeth that have been moved until complete repair has taken place.

The question naturally arises as to the length of time required for the repair of the injuries accompanying tooth movement. We can be guided by the behavior of bone in regions other than those to which we have already referred. Justification for this premise can be found in the statement made by Greig¹²: "It is unreasonable to expect that connective tissue should react in one way in one part of the body and in another way in another part of the body. Conformity in the pathology of the same variety of tissue throughout the body is strong presumption of the correctness of any theory of its growth, disintegration and repair, and to this the pathology of bone is no exception."

Thus, if we study the period of time required to repair injuries to bone in other parts of the body, we should have a clue as to the period of time required to repair the alveolar bone which has been injured at the site of compression of the periodontal membrane. A study of bone fractures is particularly appropriate because the pathologic reaction of the tissues attending a fracture, as described by Murray,⁹ shows the same conditions as reported by Oppenheim in his description of the injury to the paradentium at the site of pressure. He said:

"... the one constant factor in the production of bone by injury, disease or experiment is circulatory change. We have seen also that the one constant factor in the recognized forms of treatment for delayed and non-union has been circulatory change."

"Some bone is killed by the trauma and by the vascular disturbance attendant upon it, and that dead bone is demineralized. This is comparable to the

autolysis of any dead tissue through the action of ferments freed or activated by tissue death. . . . Circulation in this injured area is sluggish and slow, due to mechanical as well as inflammatory factors."

Clinical experience has clearly indicated that most fractures of bone, if properly stabilized, are repaired within six weeks. In very young children even less time may be required. This time coincides with the time required for the repair of an injury to the paradentium. Oppenheim⁷ noted in the treatment of a girl of 13 that: "Because of the lapse of an interval of nineteen days between the last renewal of the ligature and the extraction of the tooth we are now almost completely in the stage of repair. Both upon the bone and in all cementum resorptions we find apposition of osteoid and secondary cementum, respectively."

In view of the facts thus far enumerated, it is now possible to define the terms *intermittent* and *constant* as they apply to orthodontic tooth movement. The conventional definitions of these terms are wholly inadequate, as they do not take into consideration the biologic implications. Furthermore, the concept that a spring produces a constant pressure while the ligature and the screw deliver intermittent pressure is entirely erroneous. A pressure may be intermittently applied and still have the effects of a constant pressure on the paradentium. If a force is applied it results in tissue damage. If, then, the appliance is used as a splint to stabilize the tooth sufficiently to prevent the application of additional pressure at the site of compression of the periodontal membrane, repair takes place. If the force is not reapplied until this repair is complete, we can say that, from the biologic point of view, a force has been intermittently applied. If, however, the force is renewed before complete repair has taken place, in effect, the tissues will be suffering from the application of a continuous force because there will be cumulative destruction. Obviously, any force which is continuously applied does not permit adequate repair at the site of injury.

Thus, a spring can actually be used to apply an intermittent force and ligatures and the screw can deliver continuous forces. In the use of the lingual appliance with finger springs, Mershon¹³ actually used an intermittent force. This was evident in his description of his use of the appliance: "It is seldom that I make a readjustment on the auxiliary springs oftener than every three to eight months." Again, on another occasion¹⁴ he stated, "Adjustments in the lingual arch, unless for some special condition or reason, should not be more frequent than one every four to eight weeks."

This makes it very clear that it is not the appliance which determines the nature of the force, but the one who operates it. Thus far we have shown this to be true as it applies to the application of force, either intermittently or continuously. Now we shall explore the relationship of the terms *gentle* and *excessive* from the point of view of the nature of the force as it is related to the tissue changes incidental to tooth movement. If a force is applied through a distance greater than the width of the periodontal membrane, we

find that the tooth is compelled to lean against the alveolar crest and thus a two-armed lever is formed with two sites of compression of the periodontal membrane: the area where the tooth impinges on the alveolar crest and the apical region diagonally opposite. As a result, there is much greater tissue damage than is required. If the force cannot operate through a distance greater than the width of the periodontal membrane there is no actual crushing of the periodontal membrane, but merely a compression of it with the development of stasis and of the phenomena associated with it. It is clear, therefore, that any force which operates through a distance greater than the width of the periodontal membrane constitutes an excessive force. However, even though it may operate within the limits of the width of the periodontal membrane, if the force is reapplied before there has been complete repair of the tissues we again have cumulative destruction and this force constitutes an excessive force. Our definition, then, of a gentle force is that it is one which does not operate through a distance greater than the width of the periodontal membrane and one which is not reapplied until repair has taken place. An excessive force, according to our definition, is one which either operates through a distance greater than the width of the periodontal membrane or is reapplied before there has been complete repair.

TABLE I. WIDTH OF PERIODONTAL MEMBRANE. (In mm.)

Kind of tooth.	Width of periodontal membrane at margin of alveolus.	Width of periodontal membrane at middle of alveolus.	Width of periodontal membrane at fundus of alveolus.	Average width of periodontal membrane.
Impacted lower 2d bicuspid	0.09	0.05	0.05	0.06
Upper 3d molar without antagonist	0.10	0.06	0.06	0.09
Upper cuspid without antagonist	0.18	0.13	0.16	0.16
Upper lateral incisor in normal occlusion	0.28	0.19	0.24	0.27
Upper 2d bicuspid; heavy functional stress	0.35	0.28	0.30	0.31

The above table gives some of the figures obtained by measuring the width of the periodontal membrane of human permanent teeth under various functional conditions. (From Kronfeld: *Histopathology of the Teeth and Their Surrounding Structures*, Lea & Febiger, publisher.)

As we analyze these factors, we find that it is not the amount of force which is of importance, but rather the distance through which the force may operate and the frequency with which it is reapplied. Moyers and Bauer¹⁵ noted this fact and stated, "Distance and time can damage the periodontal membrane as much as sheer weight."

When we refer to working within the limits of the width of the periodontal membrane, it might appear as though we were imposing limitations which are insurmountable. However, an examination of the evidence clearly indicates that this is not a fact. In an examination of the widths of the periodontal membrane under varying conditions, Kronfeld¹⁶ showed that with increased functional activity (Table I) the width of the periodontal membrane is

increased. This width became as much as 0.35 mm. under heavy functional stress. When a tooth is being tipped, it will be found that the marginal ridge of the tooth moves considerably more than the root portion at the margin of the alveolar crest (Fig. 6), so that it is possible to move a tooth almost 1 mm. at the marginal crest without crushing the periodontal membrane. This is true, however, only with regard to tipping movements. When appliances are designed for the purpose of obtaining body tooth movements, the tooth is being moved throughout its entire length and, therefore, the amount of movement at the marginal ridge cannot be any more than it is at the alveolar crest. In other words, when the attempt is made to move teeth bodily, the extent of movement that can be achieved at any one time must be much less than that which is possible when teeth are being tipped.

Kronfeld¹⁶ noted that "heavy function acted as a stimulus for the periodontal tissues, which became hypertrophic."

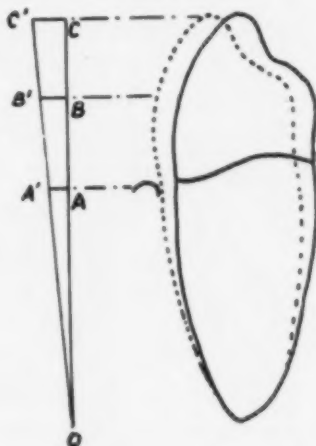


Fig. 6.—When a tooth is tipped with a gentle, intermittent force, there is only one site of pressure between the tooth and the alveolar crest. This occurs in the direction in which the force is applied and its intensity diminishes as we approach the apex. The movement of the tooth at the marginal ridge is almost twice as much as it is at the alveolar crest.

It is often possible for us to note the reaction of the periodontal membrane to an alteration in its environment in the study of roentgenograms of patients who are undergoing orthodontic therapy. On many of these roentgenograms we find that the periodontal space is increased as a result of treatment. This increase in the thickness of the periodontal membrane gives us a little greater latitude as treatment progresses, but it is inadvisable to take advantage of this fact by moving teeth more rapidly. It is far better to utilize this advantage to increase the margin of safety, thereby avoiding unnecessary tissue damage.

In the same article Kronfeld concluded with the statement: "It is not the amount of stress or function that is responsible for the final outcome and fate of the teeth, but the way in which these teeth and their surroundings react to such stress." As we learn the manner in which these tissues react, it becomes possible for us to apply forces in a manner that will tend to avoid

undue tissue damage. Our first adjustments with any orthodontic appliance should be as nearly passive as possible and the minimum amount of tooth movement should be achieved in the one or two succeeding adjustments. This results in an increase in width of the periodontal membrane. These steps have been referred to in orthodontic literature as "starting the tooth movements," "limbering up the tissues," "getting the teeth used to the appliance," etc. These are principles which can be followed in the use of any appliance.

The next item to receive consideration is the design of the appliance. This is important because an appliance may be so designed that it is almost impos-

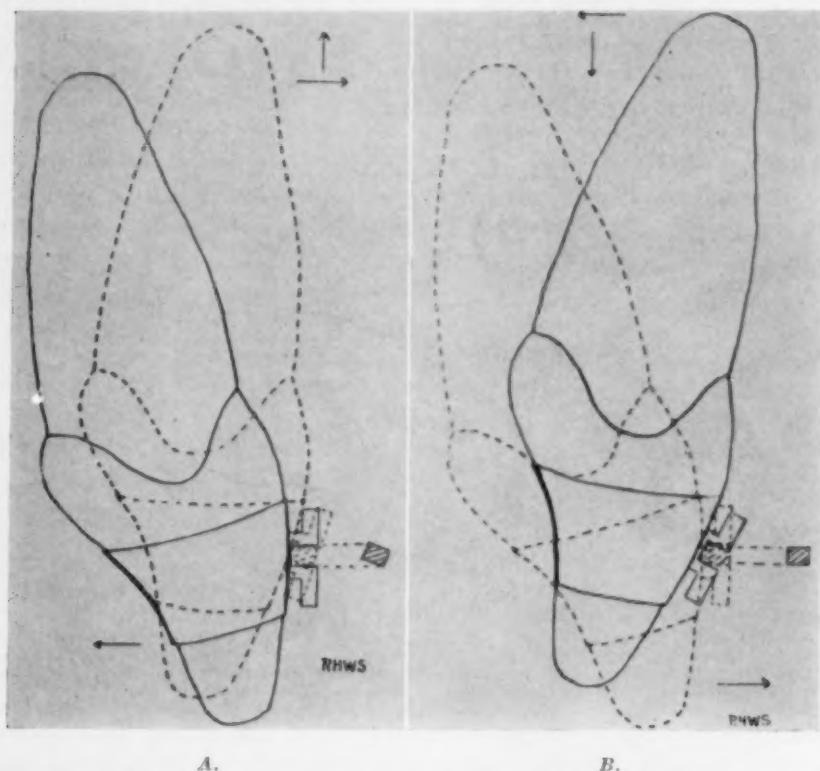


Fig. 7.—A, The tooth movement taking place under the influence of lingual torque. The solid lines show the original tooth position and the dotted lines illustrate the final position effected by the torquing action. B, The tooth movement effected by labial torque. (From Strang: Text-Book of Orthodontia, Lea & Febiger, publisher.)

sible to stay within the limits of the biologic requirements in the use of that particular appliance. When this condition arises, it is necessary to modify the design of the appliance and we must be able to define the principles which will aid us in redesigning the appliance. In this connection, it is essential that we define a term to which reference will be made in the description of appliances. This term is *mechanical efficiency*. The mechanical efficiency of any machine is defined as the ratio between the input and the output. In other words, a machine of 100 per cent efficiency delivers all the energy which has been put into it, while a machine of low mechanical efficiency delivers only a

fraction of the energy which has been put into it. The tendency since 1908 has been to develop appliances of higher mechanical efficiency so as to give complete control of each of the dental units. In the edgewise arch, as it was designed, there was a precise fit between the edgewise arch and the brackets into which it was inserted. As a result of this precision, there was no possibility of loss of mechanical efficiency except in the structural defects which may have existed in the appliance and the limitations imposed by the degree of elasticity of the material of which the appliance was made.

The arch wire becomes effective as a result of its attachment to the teeth. Because this point of attachment is so far removed from the apex (Fig. 7), all attempts to achieve apical movement create a long lever arm between the source of the force and the point to which the force is delivered. To be sure that this force is not dissipated, appliances designed for root movement must necessarily be of a high mechanical efficiency. This can be achieved only if the arch wires are highly elastic and if the attachment between the arch wire and the tooth is of a precision type. Since it is necessary that the tooth shall not move through a distance greater than the width of the periodontal membrane, the adjustments of the arch wire must be precisely made and these adjustments must be so minute that it is almost impossible for the average orthodontist to achieve this degree of skill. Moyers and Bauer¹⁵ recognized this fact. They said:

"Frequently bodily movement of a tooth is desired clinically, and it is possible to do this mechanically, but the physiologic reaction is so severe that the utmost care and caution are indicated at all times."

"The edgewise wire, square wires, and other rigid rectangular wires that are used in accurately machined brackets give rise to a similar periodontal response. It is possible with the edgewise mechanism to demonstrate actual true bodily movement of teeth in the histologic sections. But it is also true that measurements of the forces inherent within this appliance as it is ordinarily used are completely beyond the limits of periodontal tolerance physiologically. When the edgewise mechanism is used the osseous response appears quite some time after it might if a lighter action were used. This is the reason that advocates of this appliance invariably begin their therapy with a very light round labial arch wire. The periodontal response justifies that procedure. But this still does not prevent the subsequent insult and trauma to the membrane once the stiff rectangular arch wire is applied. It is true that certain movements can be carried out more efficaciously with this appliance than many others in common usage, at least the histologic findings would so indicate, but it is also true that it requires the utmost care and caution to avoid making a hemorrhagic mass of the membrane. Experimental data show that root resorptions are caused more easily with this appliance and the pin and tube appliance than any others tested. From a practical standpoint these studies seem to indicate that all of the movements possible should be carried out with the light round arch wire first. The avoidance of an early insertion of the edgewise mechanism will minimize periodontal trauma. It should also be noted that it was only with extreme difficulty that pure bodily movements were demonstrated with this appliance; the result almost invariably is a combination of tipping and bodily movement."

Since the light round arch wire is commonly employed in the initial stages of treatment, in conjunction with the edgewise brackets, it is necessary to analyze the effects of the force generated with this type of arch wire. In its effects on the tissues, it will not differ materially from the middle portion of the twin wire mechanism. In referring to the twin arch, Moyers and Bauer¹⁵ stated:

"Of the appliances tested, the twin arch was easier to apply in the desired range of force application. But do not be deceived by the apparent light, delicate action of this appliance. It is too often allowed to act over a dangerously long expanse with the resultant effect of damage not unlike that seen with mightier appliances over short distances."

"Apparently the greatest danger in this appliance is the tendency to allow the twin section to be active over too great a distance. Many men use this appliance because of its light action; they should also make sure that the action has a short effective distance as well."

As we analyze the reaction of the parodontium to the various types of forces that can be generated, it becomes possible to determine the characteristics of an appliance that would best serve our needs and the methods by which this appliance should be manipulated.

In referring to the characteristics of an ideal appliance, Terwilliger¹⁷ set forth the following characteristics:

"Abandoning for a moment the discussion of orthodontic treatment in terms of specific means for attaching teeth to the arch wire, what might be set up as the desiderata of the ideal orthodontic appliance? Disregarding the probability of ever obtaining such a mechanism, one might say that the ideal appliance would permit every tooth the independence of movement afforded in a mouth where occlusion is normal, and where no appliances are present, that it would *influence* each tooth to its proper position without inexorably *moving* it there, that the motive force for this change in position would come from mastication, and that tooth movements in a desirable direction would be given complete freedom, while undesirable movements would be gently but firmly opposed."

The characteristics of the ideal appliance, as described by Terwilliger, would, therefore, eliminate the use of precision type of attachments. By the elimination of these attachments, teeth would be permitted an independence of movement of the greatest possible extent, and at the same time the elimination of these attachments would provide a greater margin of safety by reducing the mechanical efficiency of the arch wire. His last requirement, namely, "that tooth movements in a desirable direction would be given complete freedom, while undesirable movements would be gently but firmly opposed," indicates the necessity for the use of heavier arch wires to prevent further compression of the periodontal membrane at the site of pressure. Thus, we see that as we tend to decrease the mechanical efficiency of an appliance and as we utilize the heavier gauges of the arch wires, we tend more nearly to approach the ideal appliance.

However, even the ideal orthodontic appliance could not prevent its abuse. There is no appliance that is foolproof. Moyers and Bauer¹⁵ referred to this

fact in the following statement: "Perhaps some of our failures are due to our mechanical inabilities; more, it would seem, can be attributed to our lack of understanding of the significant role played by the periodontal membrane in tooth movements." They continued with the following admonition: "As we strive for more effective and efficient appliances, let us search for a mechanism that will enable us to treat this delicate tissue with the respect it demands. Or let us devise new methods of handling present-day mechanisms so that the routine traumatic pathology of this tissue will be avoided."

Now, let us see what methods will enable us to utilize an appliance in a manner that will produce the best results with a minimum of injury. Moyers and Bauer¹⁵ agreed with the findings of Oppenheim. They said, "Regardless of how the movement might be classified, the periodontal membrane knows nothing of number or shape of arch wires; it simply reacts biologically to weight of force application, distance of force application, and duration of time the force is active."

We must conclude, therefore, from the findings in the field of biology, that orthodontic therapy consists essentially of the creation of traumatic injuries and the creation of conditions that encourage their repair and that these injuries must not be permitted to become extensive. As we control the amount of injury and wait for repair before the development of additional trauma, we gradually move the teeth into their proper positions. In order to achieve this objective, a tooth should not be moved through a distance greater than the width of the periodontal membrane and then the appliance should serve as a splint until repair has taken place. When appliances are used in a manner that disregards these biologic principles, orthodontic therapy results in the loss of part of the paradentium. If this loss cannot be controlled, it is possible to damage the supporting structures to a degree that would endanger the life of that tooth or of the dentition. It is incumbent upon us to direct our attention toward the biologic requirements of orthodontic therapy if we are to serve the best interests of our patients. If Dr. Angle had had available to him the biologic advances that have been made since his passing, there is no doubt that he would have been the first to advocate changes in our appliance therapy to coincide with the advances in the field of biology. I think we all agree with Terwilliger,¹⁷ when he stated: "In speaking of mechanics, it is often said of Dr. Angle that he would never have been satisfied with what he called the 'Latest and Best.' No doubt, that is true. I believe, however, that he would have directed his efforts toward answering the physiological requirements, for his method of appraising appliances was first, physiology, second, mechanics, third, art."

As we study these biologic requirements, we find that it is entirely possible, at least theoretically, to move teeth bodily. However, the conditions that would make this type of tooth movement possible appear to be insurmountable. In the first place, the adjustments would have to be within so small a range that it is practically impossible for anyone to develop the necessary skill. Then, were it feasible to develop this skill, it would be possible

to move an individual tooth bodily, but the problems involved in the movement of the entire dentition bodily are such that no one could develop this skill. To do this, either intermaxillary or extraoral anchorage would become necessary and neither of these sources can be controlled to the extent necessary to achieve this end. Our clinical experiences in the attempt to achieve bodily tooth movement of large numbers of teeth, since 1908, should be sufficient and conclusive evidence that this type of tooth movement is beyond the control of any orthodontist. Were this not true, we should never have developed the various concepts that have resulted in theories to justify the extraction of teeth on a large scale. This does not mean that extractions are never indicated, but it does mean that biologic considerations are the only factors available to guide us in arriving at the conclusion that any dental unit should be removed.³

As we reviewed the relationship between the interpretation of the tissue changes incidental to orthodontic tooth movement and clinical practice, we found that these interpretations have a very definite bearing on:

1. The manner in which pressure shall be applied with an orthodontic appliance.
2. The design of the appliance to best carry out these objectives.
3. The determination as to whether or not the treatment should be undertaken in any particular case.
4. Whether or not extractions are indicated as part of the plan of treatment of any particular case.

As we examine these four items, we are compelled to conclude that:

1. Since the application of pressure with an orthodontic appliance constitutes a trauma, it is important to limit the degree of tissue damage. This can be achieved only if the force is not exerted through a distance greater than the width of the periodontal membrane. As with all traumatic lesions in bone, it is essential that there be no additional insult to the tissues until repair of the injured parts has been accomplished. This necessitates a splinting of the tooth in a manner which would prevent the possibility of additional damage at the site of injury, while it would permit the maximum freedom of action of that tooth in every other direction.

2. Since the periodontal space is extremely minute, it is advisable to use appliances of a low mechanical efficiency. This affords a greater margin of safety to the operator and avoids the need for the development of skills beyond that which can be achieved readily even by skilled operators.

To protect the injured tissues from additional trauma, it is essential that the appliance be rigid enough to avoid the application of additional pressure to the site of injury. To achieve this, the appliance must be capable of withstanding the pressures exerted by mastication. If the appliance is very flexible, it may result in the development of backlashing.

3. No treatment is ever indicated if the nature of the tissue changes incidental to the anticipated movements would result in an excessive destruction of the paradentium. It must also be emphasized that no treatment is ever indicated unless there is a reasonable assurance that the etiological factors have been controlled or will be controlled. If this precaution is not observed, there can be no reasonable assurance that the results achieved can be maintained.

4. With the introduction of appliances of a high mechanical efficiency, it was presumed that the teeth could be moved about at will. This assumption has not been justified by either clinical experience or biologic research. With the introduction of these appliances, it was but natural to assume that no teeth should ever be extracted. As time and experience proved that the teeth could not be moved about at will, it was but natural that the practice of extracting teeth should once more become an accepted orthodontic procedure. However, the extraction of teeth cannot be condoned today any more than it was between 1900 and 1925 unless we can demonstrate that appliances can be operated in a manner that will produce a dental relationship that is conducive to the maintenance of the health of the investing tissues. If the tooth movements indicated are bodily tooth movements, we are faced with the same problems regarding the control of appliances of a high mechanical efficiency within the biologic limitations imposed by the periodontal membrane.

It was considered poor practice to extract teeth during the era when it was assumed that teeth could be moved about at will. Unfortunately, the pendulum tends to swing too far in each direction. When it was found that teeth could not be moved at will, it was considered reactionary to oppose the wholesale extraction of teeth. A study of the tissue changes associated with tooth movement is the only means of determining whether or not an extraction is indicated.

"The hypothetical ideal requires that each tooth shall assume its normal position in the dental arch. This is a goal toward which the orthodontist should strive, but it is not *always* feasible to approximate it. Extractions must *occasionally* be resorted to, but there is no rule of thumb or geometric pattern that can be used to determine when extractions are indicated. The determining factors are the biological limitations of tooth movement. When the apical base indicates that the removal of any unit, or units, will permit the establishment of normal axial inclinations of the remaining teeth, normal proximal contacts, and if the vertical overbite can be maintained within the normal range, it is justifiable to resort to extractions."³

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745 FIFTH AVE.

A TECHNIQUE OF SURGICAL ORTHODONTICS

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THE management of certain unerupted and malposed teeth has not been mutually satisfactory to the orthodontist or to the oral surgeon. When the axial inclination of such teeth is distorted beyond the usual axis of eruption or when developing and erupting teeth meet impedimenta, they cannot assume their rightful or useful positions in the dental arches. Previously described techniques^{1, 2} of uncovering unerupted tooth crowns followed by orthodontic guidance, have salvaged teeth which otherwise would not have been functional. In many instances these combined surgical-orthodontic measures have been slow, have required appliances, and have increased considerably the cost of the orthodontic therapy.

A technique is described here which, in appropriate instances, brings unerupted and malposed teeth into alignment and functional position easier and sooner.

HISTORY

The *replantation* of teeth³⁻⁵ has been discussed and reported often. Although successful cases have been recorded, the incidence of tooth resorption and eventual loss or failure to obtain reattachment of the periodontal fibers to the cementum has been sufficiently high for the technique to be considered questionable and temporary. The *transplantation*^{6, 7} of fully developed teeth, likewise, has not been successful. However, the autogenous transplantation of developing tooth follicles is another matter. Apfel⁸ has confirmed that when developing tooth follicles are carefully removed surgically and transplanted, enamel continues to form and root development is initiated. His photomicrographs of immature teeth so transplanted and later removed demonstrate pulpal vascularity and dentine and cementum development after the surgical intervention. Green⁹ and others have established the tenacity of embryonic or developmental tissues to continue to grow and undergo cellular differentiation and specialization when transplanted. Nuckolls¹⁰ described the morphologic characteristics reproduced from the most primary of tooth germ cells in *in vitro* studies of cultivated tooth germs of mice and rats. Even *in vitro*, odontoblasts formed and once they matured, dentine was produced. Fong¹¹ has reported thirty developing third molars transplanted into the first molar position, and demonstrates root development and maturity. Undisputedly, surgical intervention can be accomplished in the life of a developing tooth without interfering with the tooth's integrity.

Read before the Northeastern Society of Orthodontists, Boston, Mass., Nov. 9, 1953.

REDRESSEMENT FORCÉ

The forceful, sudden positioning of malposed, erupted teeth was reported by Pierre Fauchard in 1733, and was accomplished with exodontia forceps. Many of the prominent European dental practitioners of the eighteenth and nineteenth centuries practiced this technique of redressement forcé. Cunningham of Cambridge, England, in 1893, proposed certain refinements of the original technique by removing the alveolar bone in an effort to diminish the incidence of pulp necrosis. On pages 796 to 822 of the *Handbuch der Zahnheilkunde* (vierter Band), Dr. Gustav Korkhaus describes in detail the development and modifications of redressement forcé. The technique received little attention in the development of American orthodontics because of the risk of pulpal necrosis. The successful cases must have been those where rotation around the root apex was within the stretchability of the nutrient vessels, or those with incompletely developed roots. In these early reports, there is no reference to blood supply. The technique was abandoned because of the high incidence of pulp devitalization and sepsis.

THE TECHNIQUE

The method which we have employed to bring into proper alignment selected unerupted or malposed teeth is neither a technique of replantation nor one of transplantation. Rather, it is a modification of redressement forcé. It is essentially the surgical exposure of the unerupted tooth, the surgical preparation of a suitable stall in the alveolar bone, and the careful rotation or guidance of the



Fig. 1.—Note the incompletely formed roots and wide-open apical foramina. At this stage of development, the pulpal tissue is continuous with the follicular sac surrounding the root.

tooth into erupted position and the proper long axis. The tooth is not extracted, and in the correct execution of repositioning the root apex portion of the tooth is not exposed. Whether the tooth crown is brought into full or partial function depends on the location of the tooth in the arch, the expertness with which the stall in the alveolus is made (which controls the stability of the tooth), and the estimated cooperation of the young patient in avoiding certain foods and certain masticatory movements. As a rule, we have brought canines and premolars into occlusion, and have deliberately placed central incisors in slight infraversion because of the ease with which repositioned incisors might be dis-

lodged. In a series of more than fifty cases, only five required supplementary fixation or immobilization. In each of these five instances there were extenuating conditions which were departures from the established requisites.

In brief, these preoperative requirements are:

1. That the tooth in question have *incompletely developed root apices* (Fig. 1).

2. That there be *sufficient space* in the arch to accommodate the crown of the tooth to be moved. If more space is needed, it should be provided preoperatively, rather than postoperatively.

3. That the arc of rotation or alteration of long axis direction be within 90 degrees.

4. That the occlusion be such that the newly positioned tooth will not be excessively traumatized.

Perhaps a few illustrated case histories of surgical orthodontics will explain the technique.

Fig. 2.

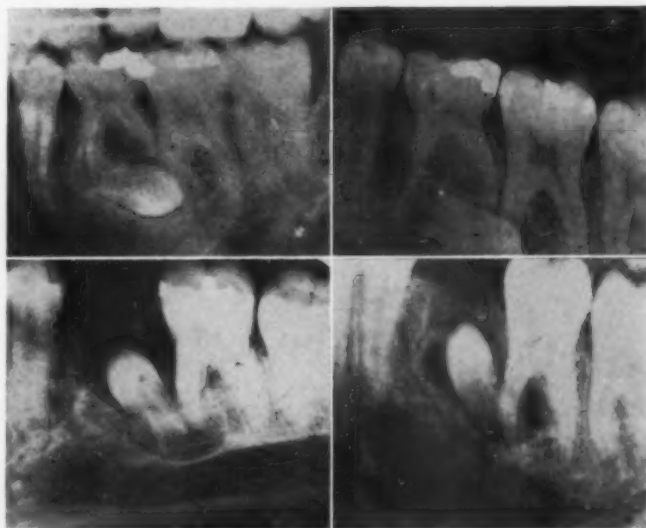


Fig. 3.

Fig. 2.—Original preoperative radiograph showing the position of the second premolar. Note follicular tissue at the root end.

Fig. 3.—Immediately postoperative radiograph. The premolar has been rotated 90 degrees and is now reasonably upright. The tooth was not extracted, but was surgically repositioned after sufficient bone was removed to correct the unfavorable long axis.

CASE 1.—A 13-year-old girl had an impacted, unerupted, incompletely developed mandibular right second premolar caused by overretention of the deciduous second molar. In June, 1951, the deciduous molar was extracted, and the inverted premolar was surgically repositioned 90 degrees so that the long axis was favorable for eruption. The tooth erupted and root development went on to maturity (Figs. 2 to 5).

CASE 2.—A 7½-year-old boy had two supernumerary teeth, retention of the maxillary left deciduous central incisor, and an unerupted left permanent central incisor. In November,

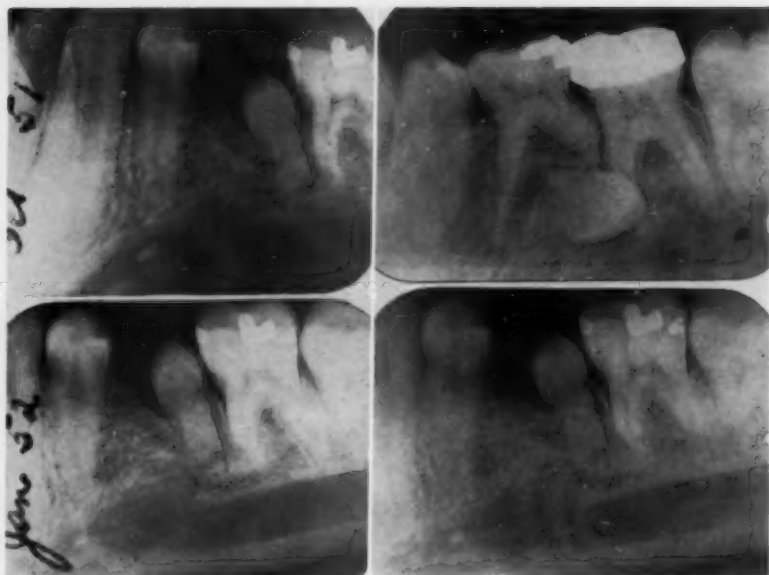


Fig. 4.

Fig. 5.

Fig. 4.—Four months and seven months postoperatively. Note bone repair, improvement in long axis, and root development.

Fig. 5.—Comparison of a preoperative film (June, 1951) and one taken seven months postoperatively (January, 1952).

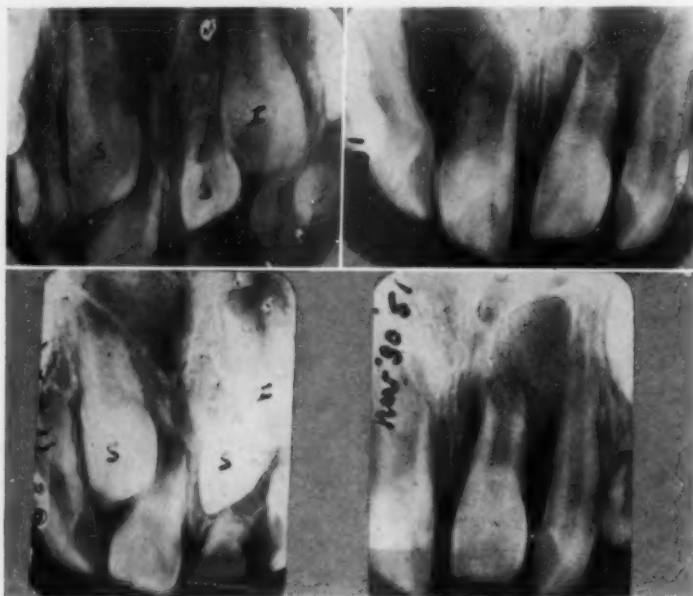


Fig. 6.

Fig. 7.

Fig. 6.—Original radiographs. The two supernumerary teeth are marked *S*. The unerupted left central incisor is marked *I*. The deciduous left central incisor is in place; the permanent right central incisor has erupted.

Fig. 7.—Immediate postoperative films. The supernumerary teeth have been excised. Note the new position of the left central incisor. Its root apex is wide open, and its crown is in infraversion to prevent it from being dislodged in masticatory movements.



Fig. 8.—Photograph of the maxillary left central incisor after having surgical orthodontics one week previously. The gingival sutures are still in place.



Fig. 9.—Photograph in February, 1952, three months postoperatively.



Fig. 10.—Preoperative film, and one taken ten months postoperatively. Note closure of apical end, degree of root movement, and remnant of the root follicular sac. The bone has filled in, the tooth is firm, vital, and now in full position.

1951, the supernumerary teeth were excised, the deciduous central incisor extracted, and the permanent central incisor uncovered and brought down in infraversion. No immobilization of the repositioned tooth was employed (Figs. 6 to 10).

CASE 3.—A 14-year-old boy had a retained maxillary deciduous canine and an unerupted permanent canine. The deciduous canine was extracted and the permanent canine uncovered. A stall was prepared in the alveolar bone and the tooth repositioned in excellent alignment (Figs. 11 to 16).



Fig. 11.—Preoperative radiograph showing position of permanent canine; deciduous canine is overretained.



Fig. 12.—Photograph of tooth one week postoperatively, sutures in place, tooth in occlusion, and no immobilization. The patient is on a soft, solid diet to allow reattachment to the place without the trauma of occlusal stress.

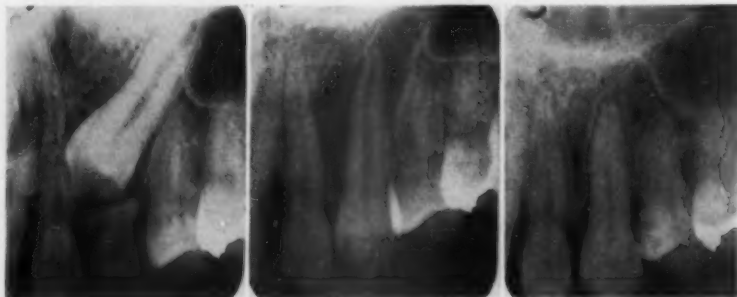


Fig. 13.—Original radiograph, one month postoperatively, and ten months postoperatively.

Fig. 14.



Fig. 15.

Fig. 14.—Photograph one month after surgical orthodontics. The tooth is firm; the gingiva has not completed repair.

Fig. 15.—Ten months postoperatively. The tooth is vital, in excellent position, and in full function; the gingival color and contour are fine.



Fig. 16.—Original radiograph and film ten months after the canine was repositioned.

CASE 4.—A 7-year-old girl had an unerupted maxillary left central incisor. The deciduous incisor was in place, and radiographs revealed a supernumerary tooth which was preventing the normal eruption of the permanent incisor. The deciduous incisor was extracted, and the supernumerary tooth was excised from the palatal approach. The permanent central incisor was uncovered, the alveolus properly prepared, and the tooth brought down carefully into good alignment and full view. The patient's diet was restricted to liquids and soft solids. The tooth reattached quickly and full function was allowed after six weeks (Figs. 17 and 18).

Fig. 17.

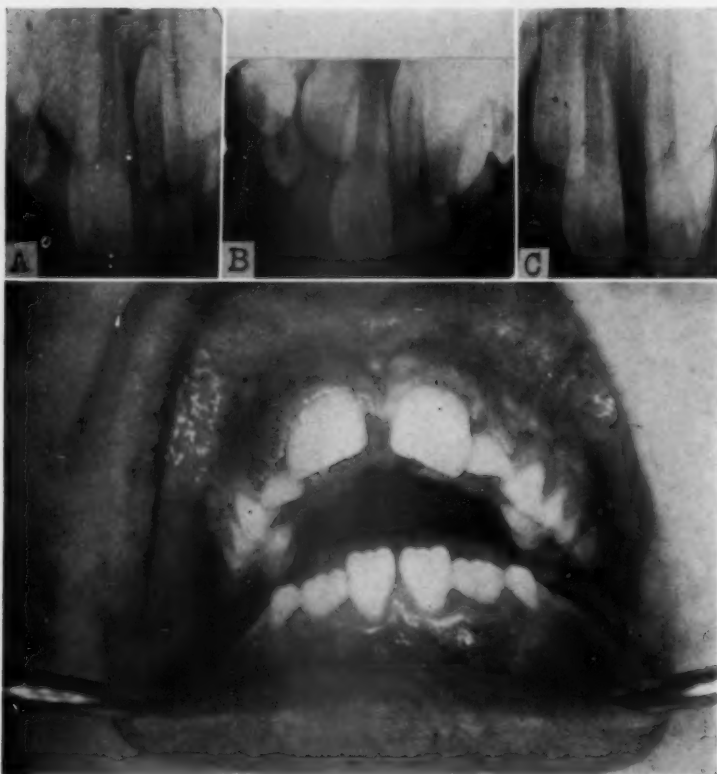


Fig. 18.

Fig. 17.—Two original films (A and B) and a postoperative film (C) one week after the central incisor was repositioned. Note the midline supernumerary tooth and the retained left deciduous incisor. The central incisor root ends are well open and their apices are enveloped in follicular sacs.

Fig. 18.—Photograph of left central incisor six weeks after surgical orthodontics. The tooth is firm, vital, and is held by normal periodontal structures. It is now in full function.

CASE 5.—A 9-year-old boy had an unerupted maxillary central incisor. The radiograph revealed a supernumerary tooth, which was excised. At the same time, the unerupted central incisor was brought down and deliberately left in infraversion (Figs. 19 to 21).

CASE 6.—An 11-year-old girl had both maxillary deciduous canines in place. There were follicular cysts associated with the crowns of both unerupted permanent canines. The roots of both maxillary lateral incisors had undergone considerable resorption as a result of pressure from the follicular lateral cysts of the canines. The lateral incisors were symptom-free and vital, however. In this case, each side was done at a separate sitting. There had been some closure of the spaces so that there was not sufficient room to position the crowns of the moved canines ideally. The right side is illustrated (Figs. 22 to 25).



Fig. 19.



Fig. 20.

Fig. 19.—Photograph showing the relative positions of the palatally placed supernumerary crown and the permanent central incisor crown.

Fig. 20.—The supernumerary tooth has been excised. The central incisor is now brought down into the stall previously prepared for it in the alveolus. It is left in infraversion and no immobilization is used. The gingival flaps are replaced and sutured.

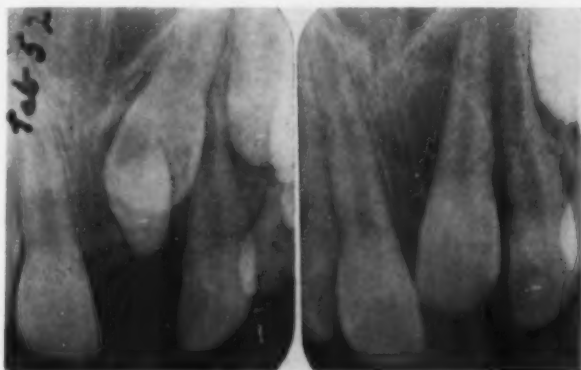
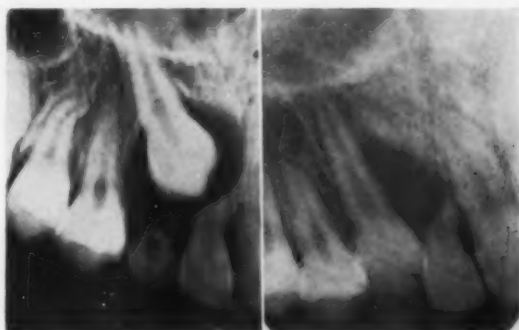


Fig. 21.—Immediate pre- and postoperative films.



A.

B.

Fig. 22.—A, Preoperative film showing the deciduous canine crown, the resorbed lateral root, and the cyst about the crown of one of the unerupted canines. B, Film taken immediately after the canine was repositioned and the cyst removed.

Fig. 23.

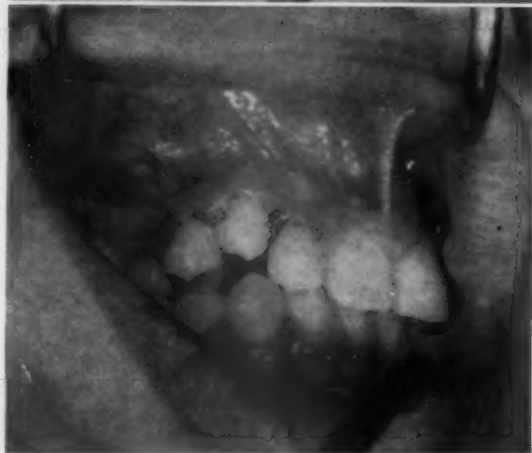


Fig. 24.

Fig. 23.—Photograph at completion of the operation. Note that there was insufficient room to position the canine crown ideally. In spite of the root resorption, the lateral incisor was firm and vital.

Fig. 24.—Photograph six weeks postoperatively. The crown of the repositioned canine cannot assume its rightful position until space is created for it.



Fig. 25.—Postoperative film five months after surgical orthodontics. Note filling in of cystic defect around the lateral incisor, and apical lamina dura around the repositioned canine. Orthodontic treatment will be necessary to provide more space for the canine.

Fig. 28.



Fig. 29.



Fig. 27.



Fig. 26.—Preoperative films.

Fig. 27.—One week postoperatively. Sutures are in place. The tooth is in excellent position.

Fig. 28.—One month postoperatively.

Fig. 29.—Photograph ten months after repositioning.

Fig. 26.





Fig. 30.—Position of maxillary canines.

Fig. 31.

Fig. 32.

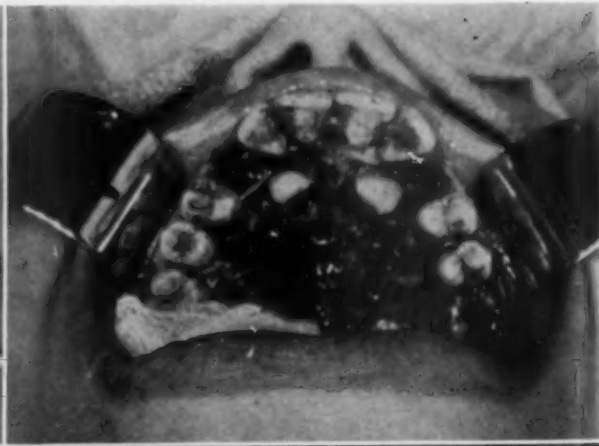


Fig. 33.



Fig. 34

Fig. 31.—Photograph showing deciduous canines in place.

Fig. 32.—Photograph showing the uncovering of the permanent canine crowns. The deciduous canines have been extracted and the bone is prepared to receive the permanent canines.

Fig. 33.—The canines are now moved into the correct position. Bone chips are packed into the space around the roots.

Fig. 34.—Side view of left canine at completion of operation.

CASE 7.—It is important to establish some age limitation after which this technique would be hazardous. Although we have repositioned some fully developed teeth, until a larger series is compiled and until the cases are followed for a number of years, it is suggested that surgical orthodontics be limited to those teeth with immature roots. This case is one from the older age group.

A 17-year-old girl had an impacted unerupted maxillary canine. The deciduous canine was lost six years previously. Although the root of the canine at 17 was fully developed, the crown was exposed, a stall was made in the alveolar bone, and the canine was brought down into the correct long axis direction in December, 1952. It has excellent reattachment, is normal in color, and radiographically the periapical bone appears normal (Figs. 26 to 29).

Fig. 36.



Fig. 35.

Fig. 37.

Fig. 35.—Radiograph one month (top) and seven months (bottom) after surgery. The canine shown on the left was too tightly wedged in the stall and shows evidence of root resorption on the distal side.

Fig. 36.—Lateral view of the left canine seven months after surgical orthodontics.

Fig. 37.—Full view of both repositioned canines seven months after operation.

CASE 8.—Not infrequently both maxillary canines are unerupted and impacted. We have repositioned both teeth at one sitting, as Case 8 illustrates.

A 14-year-old girl had unerupted right and left maxillary canines. The deciduous canines were retained (Figs. 30 to 37).

EXPLANATION OF THE RESULTS

One of the requirements of this technique is that the root end of the tooth to be repositioned be immature (that root development be not completed and

that the apical portion be open). Roots that are in a state of development have at their growing ends remnants of the dental papilla (Fig. 1). Decalcified sections of such a tooth are shown in Figs. 38, 39, and 40. Notice the extension of the pulpal tissue beyond the area of calcified root. Clinically, this tissue appears as a soft, whitish, mushroom cap adherent to the root undergoing maturity, and persists until root development has ceased and the apical foramen has narrowed. The success of this technique of surgical orthodontics is very largely related to this developmental tissue. Being firmly adherent, this follicular root sac moves with the rotated or repositioned tooth, and it is largely through it that pulpal vascularity is maintained.

Teeth with developing roots have young pulpal tissue which, as Fig. 40 shows, is merely an extension or reflection of the remnants of the dental papilla. Young pulpal tissue has relatively few connective tissue fibers and is very cellular. The connective tissue does not become fibrous and collagenous until the pulp gets older after eruption and complete root formation. In the young pulp there are undifferentiated mesenchymal cells.¹² This pulp mesenchyme has the ability not only to undergo cellular changes, to produce endothelial blood channels which are the early pulpal capillaries, but also to produce blood corpuscles independent of the primary hemopoietic tissues. Without question, the young pulpal tissue has great reparative powers. Because of its embryonic characteristics, tremendous metaplastic capabilities, and rich vascularity, the dental pulp and its apical dental papilla remnant withstand the intervention of this technique of surgical orthodontics and go on to pulpal maturity, vascularity, and root development in the absence of infection.

THE BLOOD SUPPLY

The critical factor in the surgical repositioning of unerupted or malposed teeth is either the maintenance or rapid restoration of the blood supply to the pulp. When these teeth are properly selected and there is residual dental follicle or sac at the root portion, this sac is moved with the tooth. Therefore, the tooth's vascularity is assured because the blood supply to the pulp comes from this sac. At this stage of development the follicular sac and pulpal tissue have a diffuse, rich capillary plexus which was formed by the inherent ability of the pulpal mesenchyme to form its own endothelial channels, rather than definite arterial or venous differentiation. This plexus is not directly connected as yet with the main arterial supply or venous return. These connections ultimately result after fusion or coalescence of the plexus, differentiation, maturity of root formation, and disappearance of the dental follicle remnants and Hertwig's root sheath. "Delicate injections show that diffuse capillary plexuses

Fig. 38.—Decalcified section of developing root. Note the continuity of pulpal tissue and root end follicular tissue.

Fig. 39.—The blood supply at this stage of development is not differentiated into specific arterial and venous channels, but is merely a capillary plexus derived from the connected to the follicle. As the follicle moves, so does the tooth's nutrition. The nerve connections likewise are not yet directly connected with the parent sensory system.

Fig. 40.—Enlarged section of root pulpal tissue shown in Fig. 39. Young, cellular, pulpal tissue. Such tissue has the ability to form its own blood channels, and undifferentiated connective tissue cells have great reparative powers.

Fig. 38.



Fig. 39.

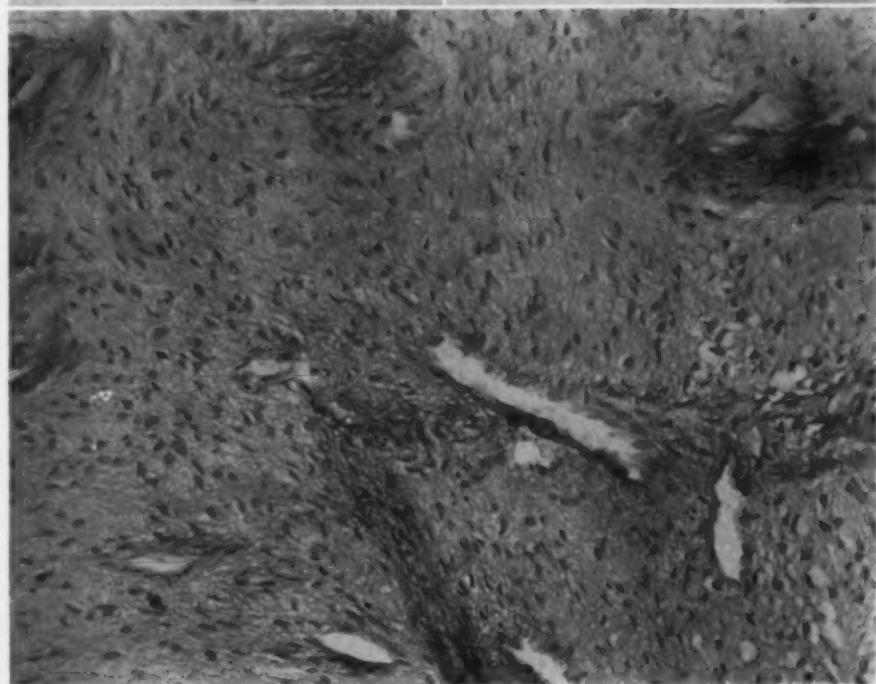


Fig. 40.

Figs. 38, 39, and 40. (*For legend, see opposite page.*)

precede the formation of definitive arterial and venous trunks . . . it is only through the selection, enlargement and differentiation of appropriate paths in such capillary networks that the definitive vessels arise."¹⁴

The eventual connections of the invaginating central blood vessels (in the bone around adult teeth) with the predeveloped capillary network of the young pulp and remnant of the papilla are multiple, and remain somewhat multiple even after the sac has produced the adult apical root end. Through foramina in the region of the root apex, there are usually a number of blood vessels which enter the pulp and have their origin in the vascular network of the surrounding cancellous bone.

Even though the capillaries in the follicular sac are torn during the surgical movement of the tooth, there is a blood clot plus the remarkable ability of the pulpal mesenchyme to organize and the versatility of young connective tissue to repair. Thus, vascularity, in the absence of infection, is assured. Pulpal survival is accounted for on this basis.

NERVE SUPPLY

In a personal communication Shour¹⁵ states, "The blood supply at the apex of an incompletely formed root is rich, and on injury in this area should have an excellent chance for recovery. If the amount of movement of the blood vessels is considerable, it is, of course, most likely that they would rupture. In that event, a blood clot would form, and in the absence of infection the healing should be successful. In case the connective tissue of the pulp should degenerate, it is conceivable that it would become resorbed and be replaced by young proliferating invading connective tissue from the periapical area."

Boyle¹⁶ and Robinson,¹⁷ in personal communications, have confirmed the high potential and capabilities of the pulp to regenerate, and have affirmed that the vitality of the pulp tissue is dependent chiefly on its vascularity.

As far as nerve tissue is concerned, it is believed that there is no direct connection or hookup with the parent sensory nerve ganglion until the tooth erupts and until root formation is nearly completed. Likewise, it is known that a traumatized pulp will give diminished or no vitalometer response for varying periods after injury. We have not relied on vitalometer recordings as an indication of successful tooth movement. Instead, continued root development, continued narrowing of the apical opening, appearance of the surrounding bone by x-ray, color of the crown, and absence of inflammatory signs and symptoms have been our methods of evaluating success.

It may well be that the surgical intervention necessary to accomplish this technique permanently interferes with some pulpal sensory nerve fibers. This is of no practical import. When there is pulpal vascularity and sound periodontal attachment, the integrity of the tooth is maintained. Pulp necrosis is a matter of blood supply rather than sensory innervation, and the proper application of this technique has demonstrated adequate pulpal vascularity for continued root development and tooth maturity.

PERIODONTAL MEMBRANE ATTACHMENT

Equal in importance to pulpal vascularity is healthy, firm, periodontal membrane attachment to the cementum and alveolus. The rapidity with which these surgically repositioned teeth become firm, the absence of pockets, the determination of normal bone repair, and the evidence of lamina dura by x-ray examination are ample proof of the remarkable reparative properties and versatility of the connective tissue involved. In practically all of the cases, no splints, wires, or other supportive or immobilization appliances were used. The periodontal membrane restored its physiologic thickness, and the bone repaired the space formerly occupied by the tooth. New alveolus filled in around the "stall" to which the tooth was moved.

We have relied on the wedging principle to hold these teeth reasonably firm. In one instance, the tooth was so tightly jammed or wedged into the surgically created stall that excessive pressure or overcompression resulted, and some resorption of cementum and dentine followed (Fig. 35). In another instance, when a canine was brought into position the occlusion was so traumatic that the severe, intermittent trauma caused bone resorption and prevented the periodontium from establishing its normal thickness and bone-cementum attachment. Lefkowitz and Waugh¹⁸ have described and illustrated similar changes in the periodontal membrane and bone in their excellent report on "Experimental Depression of Teeth."

Therefore, the degree of wedging of the repositioned tooth and its occlusal stresses are essential considerations in the success of this technique. The occlusal stresses must be minimal during the phase of reattachment.

MODIFICATIONS OF THE TECHNIQUE

Although we have recommended this technique essentially for unerupted and incompletely formed teeth, it has been employed to reposition malposed, erupted teeth where, by pendulum-like rotation, the crown is rotated in a wide arc, yet the apical root movement is negligible. Here there is a greater risk of pulpal necrosis.

When tooth movement is relatively slight, the blood vessels entering the apical foramen are stretched, but are not necessarily broken. Even in the adult pulp, the mesenchymal cells might possibly generate blood vessels, but the mechanics of the tiny foramen increase the risk of pulp necrosis because there is no collateral circulation in the dental pulp, and strangulation occurs. Hence, the conservative limitation of the technique to the wide-open, incompletely formed root with its umbrella of residual developmental tissue.

When the apex of the tooth is fully formed, any movement is hazardous because of the risk of cutting off the pulpal blood supply by mechanical strangulation. If we could obviate the mechanical restrictions of a narrow apical foramen, orthodontics would be considerably simplified. In this regard, Theodor Blum¹⁹ reports the injury to the blood or nerve supply of some teeth, following which regeneration occurred. He quotes, "Kaletsky has demonstrated cases where vital teeth had their apices removed (root amputation) and yet their

vitality returned. It seems quite possible that the blood clot covering the severed pulp kept that portion of the tooth alive until circulation and nerve regeneration had become established."

SUMMARY

A technique of the surgical repositioning of certain unerupted and malposed teeth is presented. Fortunately, the blood supply at the apex of an incompletely formed root is rich. The developing root end is open, is highly cellular, and the pulps of such teeth have a high potential for recovery.

Radiographic evidence of elongation of the root, narrowing of the apical foramen, and evidence of lamina dura, plus firmness and normalcy of the periodontal tissues, were the criteria for successful movement.

The limitations of this technique are the age of the patient, the degree of root maturity, the absence of infection, and the degree of rotation.

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1180 BEACON ST.

THE NEWBURGH-KINGSTON CARIES FLUORINE STUDY VII. CORRELATION OF INGESTED WATER FLUORIDES TO DENTOFACIAL DEVELOPMENT

A PRELIMINARY REPORT

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DENTISTRY in public health is a relatively new field. Its inclusion in organized programs of public health came about principally as a result of the Social Security Legislation in 1935. At that time Federal funds were made available to state departments of health to expand their programs in line with the newer concepts of public health practice and administration.

As dentistry began to address itself to the public health aspects of its field, a number of problems were considered. Among these were dental caries, malocclusion, oral cancer, and periodontal disease. By far the most pressing problem is dental caries, which has received the major portion of the effort and time of public health dental personnel. The progress made in the past decade in research in caries prophylaxis for the partial control of dental caries is a tribute to the potentialities of the dental profession.

While the dental caries problem is far from being completely solved, studies of water fluoridation have demonstrated that the problem can be reduced to a point where it can be controlled. Thus, tooth loss from caries soon may be an uncommon finding, instead of resulting in the high prevalence of extractions we know today.

The caries fluorine hypothesis has been studied extensively^{1, 2} and current reports attest to the effectiveness of ingested water fluorides, when taken during the early years of life.³⁻⁶ The data from the Newburgh-Kingston Caries Fluorine Study, which has been in progress since 1944, show that the rate of dental caries experience of the permanent teeth among children can be significantly reduced. To express the dental caries experience of the permanent teeth we use the symbol "DMF" which is the sum of the decayed, missing, and filled teeth. For the deciduous dentition we use "def," which is the sum of decayed and filled deciduous teeth and those indicated for extraction. The 1951-1952 data from Newburgh and Kingston, after approximately seven years of fluoride experience, show that among the 6- to 9-year-old children in Newburgh there is a difference of 55 per cent in the DMF teeth per 100 permanent teeth erupted in comparison with the same age group in Kingston. At ages 10 to 12 years the difference is 43 per cent (Table I).

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TABLE I. DMF* TEETH PER 100 ERUPTED PERMANENT TEETH, NEWBURGH, 1944-45, 1951-52, AND KINGSTON, 1945-46, 1951-52

	AGES 6 TO 9				AGES 10 TO 12			
	NEWBURGH		KINGSTON		NEWBURGH		KINGSTON	
	1944-45	1945-46	1945-46	1951-52	1944-45	1945-46	1945-46	1951-52
Number of children examined	1,559	1,423	816	713	1,251	1,130	588	569
Number of permanent teeth erupted	15,412	14,084	8,099	7,300	27,186	24,244	13,032	12,464
Number of DMF teeth	2,528	2,182	640	1,286	6,308	5,574	1,900	3,188
DMF teeth per 100 erupted permanent teeth	16.4	15.5	7.9	17.6	23.2	23.0	14.6	25.6

*DMF includes teeth decayed, missing (lost subsequent to eruption), or filled.

TABLE II. CARIES EXPERIENCE AMONG SCHOOL CHILDREN IN NEWBURGH, N. Y., AND KINGSTON, N. Y., SIX YEARS AFTER THE FLUORIDATION OF NEWBURGH'S WATER SUPPLY, 1951 TO 1952

AGE*	NEWBURGH† (1951 TO 1952)				KINGSTON (1951 TO 1952)			
	NUMBER OF CHILDREN EXAMINED	CARIES EXPERIENCE PER CHILD			NUMBER OF CHILDREN EXAMINED	CARIES EXPERIENCE PER CHILD		
		PERMANENT‡	DECIDUOUS§	TOTAL		PERMANENT‡	DECIDUOUS§	TOTAL
6	196	0.1	2.2	2.4	160	0.3	4.2	4.5
7	203	0.3	3.1	3.4	170	1.1	4.5	5.6
8	235	1.2	3.7	4.9	203	2.1	4.3	6.4
9	182	1.5	3.4	4.9	180	3.5	3.7	7.1
10	174	2.3	2.5	4.8	194	4.3	2.6	6.9
11	183	3.0	0.8	3.8	171	5.6	1.1	6.8
12	231	4.2	0.5	4.7	204	6.8	0.5	7.4

*Age at last birthday.

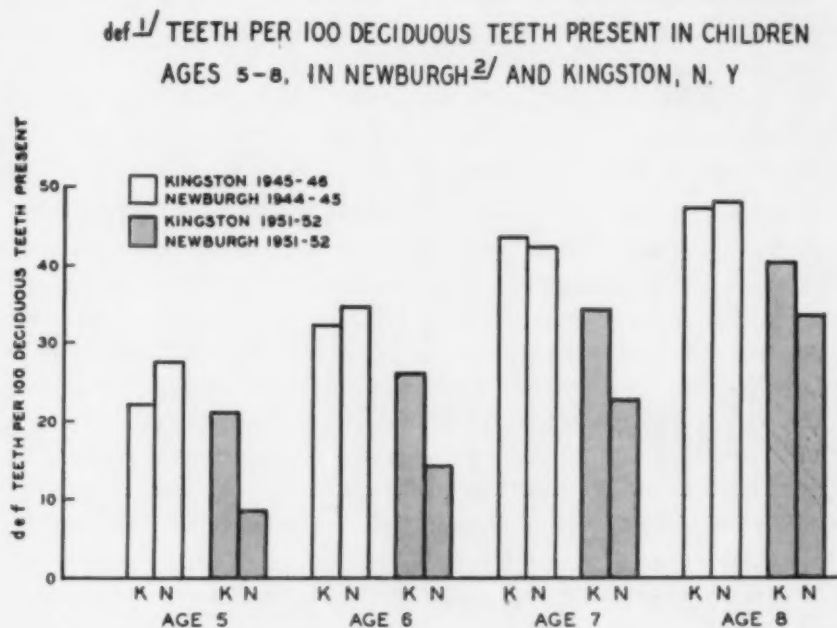
†Fluoridation of water supply initiated May 2, 1945.

‡Includes DMF (permanent teeth decayed, missing, and filled).

§Includes def (deciduous teeth decayed, indicated for extraction, and filled).

In the deciduous dentition, the 5-year-old children in Newburgh had 59 per cent less def teeth than the Kingston children, and at age 6, the differential was 47 per cent; at age 7, it was 35 per cent; and at age 8, it was 12 per cent (Fig. 1).

The total dental caries experience for both the permanent and deciduous teeth per child is shown in Table II. At each age level from 6 to 12 there is a difference of approximately two teeth per child which have not suffered any caries experience among the Newburgh children, as compared with the Kingston children.



^{1/}def includes deciduous teeth decayed, indicated for extraction, or filled

^{2/}Sodium fluoride added to water supply beginning May 2, 1945 to increase concentration to 1.2 ppm F.

Fig. 1.—(From Ast and Chase: *Oral Surg., Oral Med., and Oral Path.*, January, 1953.)

A study of the 5-, 6-, and 7-year-old children was made to determine how many had all of the deciduous canines and premolars present and caries-free (Table III). The central and lateral incisors were not included because we could not account for the status of exfoliated incisors. More than twice as many 5-year-old children in Newburgh had all of these twelve deciduous teeth present and caries-free, as was noted in Kingston; 56 per cent in Newburgh and 26 per cent in Kingston. At age 6, 46 per cent of Newburgh's children were caries-free, as compared with 26 per cent in Kingston, and at age 7 the rates were 25 per cent for Newburgh and 17 per cent for Kingston. For the combined groups, aged 5 to 7, the rate for Newburgh was 41 per cent and that for Kingston was 23 per cent.

TABLE III. CHILDREN WITH CARIES-FREE DECIDUOUS CANINES, FIRST AND SECOND DECIDUOUS MOLARS, 1944 TO 1952 IN KINGSTON, N. Y.
(CONTROL CITY) AND NEWBURGH, N. Y. (FLUORIDE CITY)

AGE*	KINGSTON 1945 TO 1946			NEWBURGH 1944 TO 1945			KINGSTON 1951 TO 1952			NEWBURGH 1951 TO 1952		
	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†	NUMBER OF CHILDREN EXAMINED	PERCENTAGE CARIES-FREE†
5	259	28.2	274	23.0	140	26.4	217	26.4	196	45.9	203	42.5
6	343	17.2	403	14.9	160	16.5	170	22.8	196	45.9	203	42.5
7	350	8.3	394	9.4	170	15.1		22.7				
Crude rate												
Adjusted rate‡												

*Age at last birthday at time of examination.

†Includes only those children with all twelve teeth present and caries-free.

‡Adjusted to the age distribution of children in Kingston in the 1945 to 1946 examinations.

TABLE IV. CLINICAL STATUS OF ERUPTED FIRST PERMANENT MOLARS
NEWBURGH AND KINGSTON, 1951 TO 1952

FIRST PERMANENT MOLARS	AGES 6 TO 9		AGES 10 TO 12	
	NEWBURGH	KINGSTON	NEWBURGH	KINGSTON
Number erupted	2,934	2,575	2,352	2,276
Caries-free				
Number	2,309	1,445	863	449
Percentage	78.7	56.1	36.7	19.7
Untreated caries				
Number	232	553	436	584
Percentage	7.9	21.5	18.5	25.7
Filled				
Number	382	532	922	967
Percentage	13.0	20.7	39.2	42.5
Missing				
Number	11	45	131	276
Percentage	0.4	1.7	5.6	12.1

It is pertinent to note that the 5-year-old children in Newburgh were exposed to fluoridated water throughout the prenatal period, as well as since birth, and the 6-year-old children were exposed almost all of their lives.

In 1951 and 1952, among the 6- to 9-year-old children in Newburgh, 78.7 per cent of their first permanent molars were caries-free, whereas in Kingston for the same age group, 56.1 per cent were caries-free. In the 10- to 12-year-old children, the children in Newburgh had 36.7 per cent of their first permanent molars caries-free, as compared with 19.7 per cent in Kingston (Table IV).

Orthodontists are fully aware of the potential danger of first permanent molars lost early in life. You will appreciate, therefore, the fact that among 1,404 children aged 6 to 12 in Newburgh, 142 first molars were lost. This represented 2.6 per cent of all of their first molars. In Kingston, among 1,282 children, 321 molars, or 5.4 per cent, were lost. Salzmann⁷ made a study of first permanent molars lost and reported that the extraction of first molar teeth without control of the direction of shifting of the remaining teeth in the mouth is a factor in producing malocclusion and leads to aggravation, rather than improvement, of existing malocclusion.

In addition to the dental examinations, comprehensive medical examinations are made in Newburgh and Kingston.⁸ Among these examinations are those concerned with growth and development. These include height and weight measurements, as well as roentgenographic study of skeletal development. After almost seven years of fluoride experience, the physical examinations disclosed no significant differences in height and weight among the children in the study and control areas. A review of thousands of x-ray films of the hands, forearms, and knees of the children in Newburgh and Kingston show no skeletal differences. Maturation is neither accelerated nor retarded.

The routine clinical examinations of the teeth, however, suggest possible differences in the morphology of the molars, in arch development, and in occlusion among the Newburgh and Kingston children. These clinical impressions have led to an expansion of the Newburgh-Kingston Caries Fluorine Study to include study of dentofacial growth and development.

As indicated previously, malocclusion is one of the public health dental problems to which we must address ourselves. Before public health procedures for control purposes can be adequately considered, however, one of the important prerequisites is to know what the prevalence of the specific defect may be. Our data on the prevalence of malocclusion, both quantitative and qualitative, are wholly inadequate.

The commonly expressed concept that premature tooth loss is an important etiological factor in malocclusion leads to the expectancy of a lower prevalence of malocclusion among children who have ingested fluoridated water.

Pelton and Elsasser⁹ recently reported on the use of the facial orthometer for epidemiologic surveys of malocclusion. The use of the orthometer necessitates the acceptance of an arbitrary line for making measurements outside

the face. Elsasser¹⁰ developed an index which he calls the dentofacial index (DFI) which is computed on the basis of the readings of the orthometer, and the number and percentage of children with cross-bite or crowded arch, or both. He uses this index to express quantitative and qualitative measurements of deviation from the normal.

In the study reported by Pelton and Elsasser among children in a fluoride and fluoride-free area, they concluded that dental caries and its concomitant tooth loss was not a primary etiological factor in malocclusion among children. This is contrary to current thinking, which reasons that caries, with their concomitant early tooth loss, should contribute to the etiology of malocclusion.

Several workers in the field with whom I had discussed this question have indicated that their observations suggest that general dentofacial development seems to be superior among the children in fluoridated areas. There also has been the observation that tooth morphology differs with the consumption of water fluoride, specifically characterized by molars with flatter cusps among children who have had the full benefit of fluoridated water.

It is the essential objective of the current dentofacial growth and development study in Newburgh and Kingston to test these hypotheses through comprehensive examinations of comparable groups of children in each city.

STUDY PLAN

With regard to the actual plan of study, 100 children in each year of age, 6 through 10 years, will be included from Newburgh, and an equal and comparable group from Kingston. In view of the stated objectives, the following diagnostic materials are being obtained for each child: (1) clinical dental examination using mouth mirror and explorer; (2) full-mouth intraoral roentgenographs (periapical and bite-wing); (3) right and left lateral jaw plates; (4) a profile plate with cephalostat; and (5) study casts obtained from alginate impressions.

In addition, data on medical history, height and weight, oral habits, and so forth, are being obtained. The full-time staff for the study includes two Department dentists, a dental hygienist, and a dental assistant. Their clinical facilities are housed in a fully equipped mobile dental unit. Serving as consultant to the Department for this study is Dr. J. A. Salzmann, who has planned the orthodontic phase and is guiding the field work of the dentofacial study.

The material and information accumulated for each subject is being studied with particular emphasis on summarizing the following observations.

1. *Tooth Eruption*.—On the basis of the clinical and x-ray examination, tooth eruption for each child will be categorized as "normal," "retarded," or "accelerated" according to the Logan, Kronfeld, Schour, and McCall table on the Chronology of the Human Dentition. (These data may actually test the validity of applying this table to children from this part of the country.)

2. *Tooth Calcification*.—(Similar to 1.)

3. *Cusp Height*.—This measurement is being made for each of the first permanent molars and is defined as the perpendicular distance from the depth of the central pit to the cusp plane. This determination is made with a modified Mauser Vernier caliper, with which readings to the tenth of a millimeter are possible. No measurements are made where the central pit or cusps have been modified by caries or fillings. (Fig. 2).

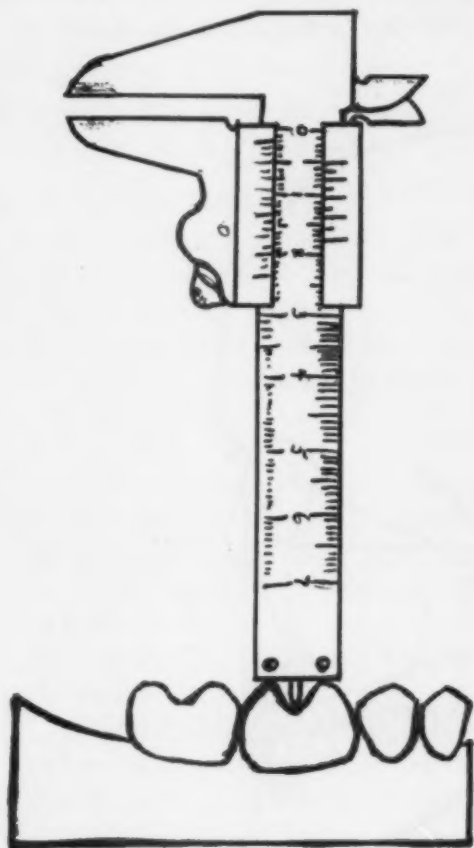


Fig. 2.

Fig. 2.—Cusp height determination, growth and development study.

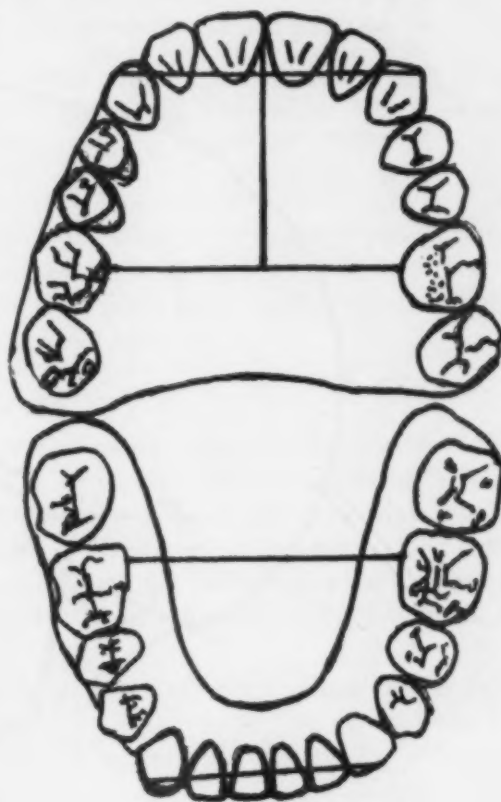


Fig. 3.

Fig. 3.—Arch formation measurements, growth and development study.

4. *Tooth Size*.—From the study casts, the mesiodistal diameter for the permanent and deciduous central incisors, permanent and deciduous canines, and first permanent molars is measured with calipers. These determinations, plus those of cusp height, should provide information on changes, if any, in tooth morphology.

5. *Arch Formation*.—Information on arch formation is being obtained from the following measurements obtained with calipers from the study models (Fig. 3):

Intermolar width, defined as the distance between the most palatal points of the upper first permanent molars and, for the lower arch,

the distance between the most lingual points of the first permanent molars.

Inter canine width, defined as the distance between the mid-points of the incisal edges of the deciduous or permanent canine teeth in each arch.

Median line length, defined as the distance from the eminence of the papilla between the upper central incisors to the mid-point of the line denoting the intermolar width.

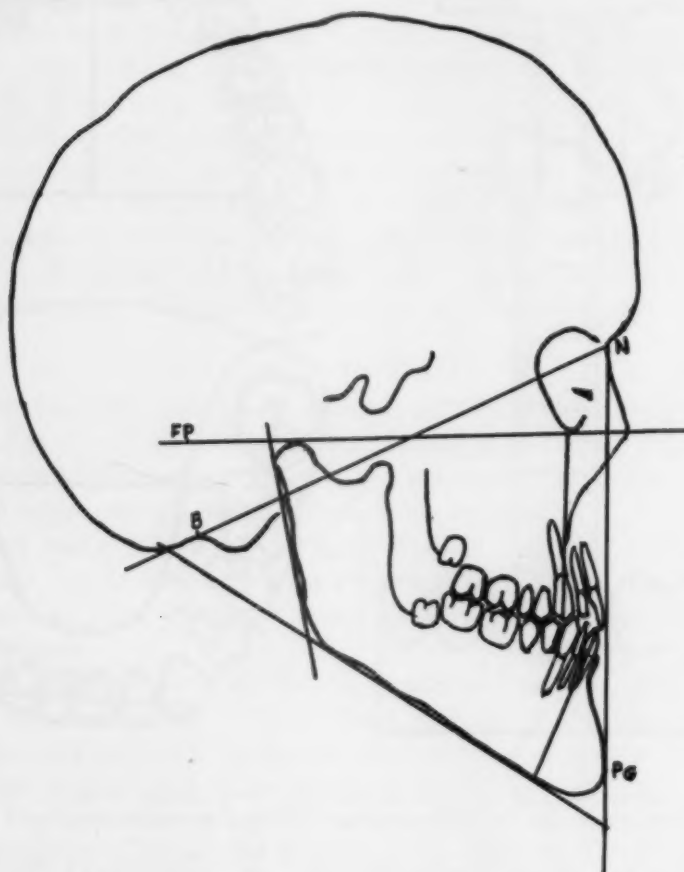


FIG. 4.—Cephalometric determinations, growth and development study.

6. *Arch Character*.—Determined from the models and classified as Normal, Wide or Constricted according to Pont's index.

7. *Angle Classification*.—Determined in the established manner from the study casts.

8. *Cephalometric Determinations*.—From the profile radiographs, determinations of the gonion angle and the incisor mandibular angle are being made. In addition, the canine-orbital plane relationship is being determined as "nor-

mal," "mesial," or "distal." Also, for each profile x-ray picture, the Margolis dentofacial triangle is being outlined by drawing the following lines (Fig. 4):

- A. From the Bolton point through nasion.
- B. From nasion through the mental eminence.
- C. Mandibular plane (tangent to lower border of mandible).

The angles formed by A and B reflect the degree of recession of the chin. The angle formed by A and C (craniomandibular angle) reflects the vertical development of the mandible.

9. *Summary of Dental Findings.*—From clinical examinations and biting radiographs, the total def and DMF teeth and involved surfaces are recorded.

10. *Missing Teeth.*—These are recorded from clinical examination, plus periapical and lateral jaw radiographs. Special note is being taken of congenitally missing permanent teeth, defined as such teeth which are absent without the presence of a follicle one year or more prior to the expected time of eruption as given in the Logan and Kronfeld table.

SUMMARY

An interim analysis is presented of the caries prophylactic effects of ingested water fluoride in children aged 5 to 12 years in Newburgh, as compared with children of the same ages in fluoride-free Kingston. These data show that among the 6- to 9-year-old children in Newburgh there are 55 per cent less DMF teeth per 100 erupted permanent teeth, as compared with the same-aged children in Kingston. Among the 10- to 12-year-old children there is a difference of 43 per cent.

In the deciduous dentition, the reduction in def teeth among Newburgh children ranged from 59 per cent in the 5-year-old, to 12 per cent in the 8-year-old children, as compared with those in Kingston.

The total dental caries experience for both the permanent and deciduous dentitions show that for each age level from 6 to 12 years the Newburgh children experienced dental decay in approximately two teeth less than the Kingston children.

Among the 5- to 7-year-old children there were approximately twice as many with all of their deciduous canines and deciduous molars present and caries-free as were noted in Kingston.

The details are presented of the dentofacial growth and development study among 1,000 children aged 6 to 10 years in Newburgh and Kingston.

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YOUR PRESIDENT REPORTS

FREDERICK T. WEST,* SAN FRANCISCO, CALIF.

I BRING you greetings from the officers of the American Association of Orthodontists and wish you the most successful meeting in the history of your society.

To say that I was flattered in being asked to visit with you is putting it mildly. The men in your group have been most active in the affairs of the American Association of Orthodontists during its illustrious career and many of you are more familiar with the internal workings of the organization than I am. However, "fools rush in where angels fear to tread," so here I am willing to discuss with you the general picture of our parent body and, I hope, to leave you with a thought or two that may be discussed at length in the not-too-distant future.

The history of the American Association of Orthodontists is a story in itself. It is not a nice story. Men of great stature with diametrically opposed opinions argued and fought and became bitter enemies; some even died actually hating a confrere who had dared to differ with them.

Such is the way of life. Such is the manner in which organizations are conceived and nurtured. Such is the way of yesterday. Today we have more scientific information. Today we are able to differ in our thesis. Today we can respect the other fellow's opinion, which in too many cases is still just opinion, *but we can differ and yet be the best of friends.*

This is indicative of progress. The American Association of Orthodontists can take the credit for this change, because it gave to dentistry an organization of an open forum in which every member had the right to express his opinion in a truly democratic way.

You undoubtedly have read or have heard of the activities of the Board of Directors at the recent American Association meeting in Chicago. The delegates, together with the officers and chairmen of elected and appointed committees, met at 10:30 in the morning on Sunday, the day before the opening of the Fiftieth Annual Meeting in the Palmer House in Chicago. There were more than thirty-seven in attendance at that Board of Directors' meeting which lasted until early evening.

Presented in part before the Southern Society of Orthodontists, Mayflower Hotel, Washington, D. C., Nov. 2, 1954.

Presented before the Northeastern Society of Orthodontists, Statler Hotel, Buffalo, New York, Oct. 26, 1954.

*President of the American Association of Orthodontists.

The second meeting of the Board of Directors began on Tuesday morning at 7:30 and was adjourned at 12:30 P.M.

Numerous committee meetings were held during the three and one-half days of formal Association sessions and on the Sunday before.

It is not incorrect to say that a minimum of seventy-five members of our Association devoted a great deal of time attending to Association affairs and many of them saw little or none of the meeting.

This number does not include the large Local Arrangements Committee whose members devoted their time, energies, and money to produce one of the largest and most successful meetings of the American Association of Orthodontists.

It was no small compliment to your constituent organization when President Ford turned to Dr. Adams and stated, "We will now take the liberty of appointing Dr. Adams as our Parliamentary. Do you accept, Dr. Adams?" and he very modestly replied, "Yes."

Then began the reports. I am not going to review the 317 pages of stenographic report of the Board minutes or the thirty-nine pages of stenotyped report of the proceedings of the two general business meetings; I am not even going to report on the thirty-two pages of abridged minutes, but I am going to ask you to bear with me for a few minutes while I try to express my appreciation to Drs. Ford, Anderson, Adams, Squires, and others who played a major part in the boiler room of the organization and who were rarely able to attend our scientific sessions.

Secretary Squires reported a total of 1,389 members as of May 16, 1954. He reported eight constituent societies. He reported a cash position as of Dec. 31, 1953, of \$2,228.34 in the checking account; \$5,075.24 in the savings account; \$20,000.00 in U. S. Government Bonds; and office equipment at cost, \$302.82; a grand total of assets amounting to \$27,606.40.

I am sure you will agree that we are in a very solvent position and that the watchdog of the finances, Frank Squires, together with a wonderful Budget Committee, has been responsible for our financial strength.

It is true that we have an increase in our dues for next year, but this is because of the increase of service to our members and the increase of over-all costs of annual meetings. Every nickel is accounted for in accurate, accepted accounting procedure.

Dr. Baker, as Librarian, has the proceedings of our Association complete in their entirety and the priceless volumes are safely stored in a locked cabinet in the library of the American Dental Association in Chicago.

A new office, that of Historian, has been added to the American Association, and Leuman M. Waugh has been appointed until the official wheels of organization procedure duly elect him to the office.

The American Board of Orthodontics, in my opinion, is one of the truly great committees of the American Association of Orthodontists. These seven men who are elected, one each year, to serve for seven years, form the bulwark of our specialty.

Last year the American Board passed judgment on 179 applicants in all categories and certified thirty-three candidates.

Imagine, if you can, the enthusiasm of Dr. Martinek, the long-suffering secretary of the Board, and of the unsung and never-mentioned heroine of the play, Mrs. Martinek. Too few people know of her loyalty and tireless energies, and the team of Martinek and Martinek have written their names indelibly in the story of the advance of orthodontics.

The members of the Board spent hours and hours of time reading, evaluating, and judging the adequacy of the theses of the candidates during the months preceding the annual meeting. The week before the meeting, they spent hours reviewing the models, personally interviewing each accepted applicant, and finally holding formal meetings of evaluation and certification.

If the American Board members are not deserving of our highest praise, cooperation, and approval, I know nothing of association mechanics; and I modestly report that I have been a constant secretary in various dental and orthodontic societies on the West Coast since 1921.

Dr. Aldrich reported that the Public Relations Committee had an easy year in 1953-1954, and presented a booklet for use in schools directing attention to the "Educational Requirements for Dental and Orthodontic Training."

Dr. Brodie reviewed the work of the Education Committee which last year determined that twenty-six schools offered full graduate training in orthodontics leading to an advanced degree or certificate and that the University of California offered an honors course for its own superior second- and fourth-year students leading to the D.D.S. degree.

Dr. Thompson, reporting for the Research Committee, stated that thirteen essays representing research investigations were submitted in the \$500.00 Prize Essay Contest. A certificate for the winner and, if the caliber of the essays warranted, honorable mention certificates for those named by the committee were recommended. There was no objection to the suggestion; but, inasmuch as finance was involved, the recommendation was referred to the Budget Committee.

Dr. Gaston reported that the Judicial Council had an easy year, with no complaints, no protests, no questions, and no correspondence.

Dr. White, reporting for the Relief Committee, stated that he had received no request for relief from any of our members. I will discuss further this Relief Committee later in this paper.

Dr. John McCoy reported that there were no laws and infractions reported to him during the year, and his report was accepted.

D. Robert Swinehart presented a complete and exhaustive report for the Military Affairs Committee. The complete report clearly and adequately takes the position that vulnerable dentists and orthodontists should protect themselves, their families, and their patients, the rights of all should be protected and respected but that the committee could not pull "rabbits out of hats" or perform the impossible. The committee concluded: "In brief, then,

this committee reports that a marked speed-up of the activities of the Selective Service System, as they relate to Dentistry, must be expected in the near future."

Dr. Salzmann reported for the Public Health Committee on the activities of that committee in working with the American Public Health Association. Orthodontics is directly and intimately tied up in the programs of the American Public Health Association and such guides as dento-facial handicaps and cleft palate deserve our careful consideration and adherence to precise routine. The Public Health Committee in the past has not had the confidence of Public Health officials, but by serious, conscientious, and painstaking efforts of many of our members, we as a profession are now accepted as a part of the Public Health team. We cannot afford to jeopardize our position or lose our advance by careless application of our services or by nonconformance to accepted regulations. We may not like the routine, records, or certain organizational requirements, but the entire philosophy is based on accepted regulations.

Dr. Eby, chairman of the Publications and Editorial Board of the JOURNAL, reported the most successful year in the history of the JOURNAL. This committee is most important because it publishes our own JOURNAL and the road is not easy.

While you and I and several hundred other members were attending scientific sessions or having fun, Dr. Eby was in the office of the American Dental Association learning at first hand the "Code of Advertising" adopted and enforced by the American Dental Association.

H. C. Pollock, Editor, was re-elected for a term of five years and presented his report which had to do with the reading material in the JOURNAL. He also reviewed the rules and regulations pertaining to manuscripts and illustrations. We are indeed fortunate to have an editor of such stature and understanding, and we are fortunate, too, that he has such an able editorial staff.

Dr. Anderson reported on the progress in terminology and stated that the American Dental Association Bureau of Library and Indexing Service was quite active in this field and that a member of the committee was present at conferences that were held.

Dr. Alstadt reported for the Code of Ethics Committee, and presented a copy of the *Principles of Ethics* to those members of the Board who had not received a copy by mail. This monumental work of two years still needed some minor changes to conform to parliamentary procedure and after a lengthy discussion the *Principles of Ethics* was finally made official.

As your President, I urge you to read and reread this document, because on these printed pages is printed the philosophy, privileges, and responsibilities of our chosen specialty. The peace and security of your life and mine depend upon the strict adherence to our code. As an old Navy man of World War I, I well remember an axiom which was taught to me that "a strict ship is a happy ship," and I can unalterably support the legend.

Dr. Holmes reported for the Necrology Committee that eighteen of our confreres had died during the past year, and our respect and sympathy are difficult to express.

A special committee to study and report on "Standards of Requirements for Membership in Constituent Societies" was presented by Dr. Thompson. His was really a majority report; a minority report was presented by Dr. Bell.

There followed sixteen pages of stenographic report on the discussion of qualifications required for membership in the American Association of Orthodontists: "Three years of specialization including one full year of university graduate or postgraduate orthodontic training, or its equivalent, with recommendation by two active members."

During this discussion, I was proud to be a member of the Board of Directors of the American Association of Orthodontists. Feelings ran high, differences of opinion were freely aired, misunderstandings and misinterpretations were discussed, but at no time did rabid emotional tirades take over the discussion.

The committee was instructed to prepare a mimeographed copy of its report and be prepared to return to the Board meeting on Tuesday morning.

Monday found the committee in session for two hours and Tuesday morning, at the end of twenty-nine pages of stenographic reporting, the following recommendation was accepted: Membership in a constituent society will require "Three years of specialization, including successful completion of an orthodontic course of a minimum of fifteen hundred (1,500) hours in a recognized dental school with recommendation of two active members."

The action of the Board was that the By-Laws Committee be authorized to prepare an amendment to be presented at the business meeting on Thursday. The proposed amendment would lay over for one year and be voted upon in San Francisco. If adopted, the amendment is operable two years from that time.

A serious-minded Board of Directors, representing you, their constituents, studied, argued, and finally adopted a report of the committee that was signed by the committee. The majority group gave ground; the minority group gave ground. All members of the American Association of Orthodontists will receive a copy of this amendment to the by-laws before the meeting in San Francisco. Study it. Discuss it in all of its phases. Be prepared, by being fully informed, to cast your vote in San Francisco as your conscience dictates.

All this time Dr. Oren Oliver's fingernails were probably getting shorter by the minute as he envisioned his job as Chairman of the By-Laws Committee and the work that he and his committee had to do to get his report in order and in exact terminology. Those of you who were present at the Board meetings and the last general business session know full well that Dr. Oliver did his job as an expert and all was in order. I pay tribute to him as a giant of strength in the American Association of Orthodontists; I have never known him to shirk a job or say "No" to a request for service in our organization.

Constituent society directors reported for their districts and, quite naturally, each presented with pride the accomplishments of his group.

Dr. Strange, for the Convention Planning Committee, reported that Miami, Florida, presented the most desirable place in which to hold the 1957 meeting, and the recommendation was adopted.

I trust that you have not been too bored with this running report, but all too often we overlook the tremendous amount of time that officers and committeemen devote to our organization that you and I might enjoy excellent meetings and legally keep our house in order.

I would like now to discuss three items which I believe deserve our thought and consideration.

First, our Relief Committee. As a past member of this committee, and finally as its chairman, I found there was nothing to do. We had no relief funds, we solicited no relief funds, and there was no prospect of receiving any relief funds. We discussed the situation at the Board meeting and decided that the committee should remain active but that the center of activity should be in the constituent society.

The present chairman of the Relief Committee, Malcolm Chipman, and I have both experienced incidents which perhaps you, too, can verify.

In my own case, as chairman of the Relief Committee for the California State Dental Association, I received a phone call asking if I knew of the grave illness of a Dr. X. Dr. X. had been a prominent and, we all supposed, a successful orthodontist in our society for many years and then retired. He was considered well off and moved to the country. After several years his mail was returned and we could not locate a forwarding address. He had just disappeared. About three years after the mail was returned this phone call told of Dr. X. being in the outpatient clinic of one of our hospitals, gravely ill, and in need of money for hospitalization, drugs, and therapy. We recognized this man's name and things began to hum. We now had addresses of his son and daughter, neither of whom was in a position to help. The American Dental Association responded immediately to our request, but help came too late and Dr. X died. Our point is that Dr. X would have been cared for had he been a stranger, but as a fellow orthodontist he received quicker, more sympathetic, and additional services than he ordinarily would have received. Even though he did not recover, we were able to care for various things that otherwise would have been a tremendous burden to others.

Malcolm Chipman reports a young orthodontist, the victim of polio, who tried to rehabilitate himself as a laboratory technician. You must know of cases that come to mind.

My thought is that our Relief Committee in the American Association of Orthodontists should be expanded to a Relief Committee in our constituent and component societies and, most important of all, there should be an orthodontist on the Relief Committee of our State Dental Associations. Our sympathy is needed in times of illness, and our action can guide a stricken man to gain hope and strength and perhaps to live.

The second item is our Necrology Committee. Dr. Dillon has devoted hours and days to trying to solve the problem of how to assist the family of

one of our deceased members, and inspired a booklet which you all received after the Dallas meeting, and which was edited by George H. Herbert.

Dr. Dillon was prompted to undertake this work because of personal experiences with families who were entirely lost as to what to do or where to turn when their husbands or fathers died, leaving an orthodontic practice to be disposed of.

Perhaps many of you have had this same experience and know of the pitfalls that these stricken families get into. Poor advice, ludicrous ideas of the family as to the value of the practice of the deceased, inadequate treatment records, inadequate financial records, inadequate treatment plans and agreement as to what was intended to be accomplished, cases that require immediate care, lack of agreement between confreres who volunteer to care temporarily for the cases under treatment, office expenses not readily available, and a thousand and one other things that one can think of cause no end of grief to the already overburdened family.

We need exhaustive study on this subject and we will continue what Dr. Dillon has started.

I know full well that some of you are thinking, "Oh, this won't happen to me," but by the same token I would not dare to ask for an honest showing of hands of those in this audience who have not filled in the Necrology Committee's booklet or even those who have not made a will.

A third problem, and it is a serious problem, is that of the transfer patient. Our *Principles of Ethics* gives us a splendid start, but the detail cannot be written.

How often have you had a patient referred to you from a distant city sans models, sans x-rays, sans treatment plan, sans everything, except the joyful tidings that greet you as you meet the transferred patient: "Oh, doctor, how soon can I get my retainers?" Dr. X. told me that it would only be a month or two before I will be finished." Can it be that I am the only orthodontist who has ever experienced this situation? I am going to ask for a strong committee to study this problem from a cold, analytic standpoint. The report cannot be compiled in a short time, perhaps not for two or three years.

As orthodontists, and as members of the American Association of Orthodontists, we have an obligation and a responsibility to the people of the state in which we are licensed. We have a duty to the people who move from one state to another.

Certainly we are not all perfect operators. I, for one, have models cached away under lock and key that no one will ever see until after I am dead, and I hope that they who find them will be charitable. Indeed our patients are not all ideal, cooperative, sincere, and honest. There are a thousand and one things that enter into our lives and our practices that are classified as human. It really isn't human, but we call it that for want of a better name.

My plea to you is: When a patient moves, be prepared to assemble all patient data and be prepared, in a manner of your own choosing, to send it

to the orthodontist who is going to continue the work. Be fair professionally, financially, ethically.

Please forgive me for preaching, but we have a wonderful specialty. When we see these youngsters, some of them almost monstrosities or at least ugly, on whom we, through our knowledge and skill, perform almost unbelievable changes in facial form, to say nothing of masticatory function and mental rejuvenation, we have a perfect right to feel proud of ourselves and our fellow orthodontists.

My Local Arrangements Committee in San Francisco asked me to bring you their greetings. George Hahn, Program Chairman, presents essayists whose names will thrill you. Imagine a program presenting Atkinson, Broadbent, Tweed, Salzmänn, Hopkins, Cooper, Westlake, Slaughter, Terwilliger, Graber, Wylie, Downs, Nanda, Paden, Murray, and Eugene West!

Reuben Blake, General Chairman, has his committees under control. A full program, plus time for entertainment, visiting, shopping, and sightseeing, is planned.

One word about our hotels—we do not have a Conrad Hilton or a Palmer House, but we have plenty of first-class hotels.

The Fairmont Hotel is headquarters, but do not be disappointed if you are not able to get reservations there. The Mark Hopkins, just across the street, is really a newer hotel; the Huntington Hotel is just one block away. The St. Francis, Sir Francis Drake, Palace, Clift, and others are just a few blocks away, and all are first class. I tell you this so that you will understand.

We want you to come to San Francisco May 8 through 12 and we pledge ourselves to "shoot the works."

Again, my sincere thanks to you for inviting me and for being such a wonderful audience.

760 MARKET ST.

Reports

REPORT OF THE COMMITTEE TO REVIEW THE PRESIDENT'S ADDRESS, NORTHEASTERN SOCIETY OF ORTHODONTISTS

YOUR committee has met and carefully reviewed the very nicely prepared address of our president, Dr. J. A. Salzmann. It is gratifying to note that he brings to the attention of this Society that the American Association of Orthodontists has for the past four years and the Northeastern Society of Orthodontists has for the past ten years been cooperating with health organizations and committees. It is fortunate for us in this Society that we have men such as Lowrie Porter, Joseph D. Eby, and our president, who could review an article such as appeared in *Good Housekeeping* of recent date to the end that its content was modified so that it presented a clearer picture of orthodontics to the layman. Your committee feels that it is heartening to note the close cooperation of the Public Health Committee of the American Association of Orthodontists, together with its advisors who included our president, Dr. Salzmann, as evidenced by the American Public Health Association's acceptance of practically all suggestions and recommendations of the American Association of Orthodontists.

Your committee agrees with the objective set forth in the suggestions regarding our Northeastern Society of Orthodontists' membership and the matter of assistance by the Society to other groups. Feeling this requires a great deal of study and realizing that some parts of it may bring up difficulties in the future, we feel that these matters should be referred to the proper committee or committees for careful study. We agree that health exhibits should be set up for health and educational meetings and feel that this committee or committees should include this matter in their study. We agree heartily with the president that a committee should be appointed to go into the question of short papers with mimeographed material given to the audience as he suggested.

Respectfully submitted,

CLIFFORD G. GLASER,

HERBERT I. MARGOLIS,

NORMAN L. HILLYER, Chairman.

In Memoriam

BEN LAVELLE REESE

BEN LAVELLE REESE, former president of the Pacific Coast Society of Orthodontists, died on May 22, 1954.

Dr. Reese worked his way through the various offices of the Pacific Coast Society of Orthodontists until he reached the highest office attainable—that of president. Subsequent to this honor, he continued to assume any responsibility offered him. His sober reflections, his limitless patience, and his endless tolerance continued to guide and influence the activities of that society as long as he was able to give counsel.

Among his virtues were humility and modesty. He knew the great and the near-great, yet he was never too busy or too engrossed in his own affairs to offer a helping hand to those who needed it. From his youth he was a friend of President Eisenhower and, although their paths diverged widely, even to the White House, this friendship never deteriorated.

Dr. Reese loved the great out-of-doors, where he enjoyed fishing and photographing the skies, waters, and little creatures of nature.

Dr. Reese will be missed by all who knew him. To his widow, Mrs. Lillian Reese, we offer our heartfelt sympathy.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Abstracts Presented Before the Research Section of the American Association of Orthodontists, Chicago, May 19, 1954

Acceleration of Cranial Growth of Young Rats Following Injection of Somatotrophic Hormone: By Gordon Robert Meeker, D.D.S., M.S., University of Illinois, Chicago, Ill.

Growth curves of different parts of the young skull are altered when growth is experimentally hastened by the somatotrophic hormone of the anterior pituitary. High doses were administered daily for thirty-four days to albino rats which were 10 days of age at the beginning of the experiment.

Both roentgenographic examination of the skull and histologic sections of two sutures were utilized in the study.

The growth hormone imparts to different rates of growth in the skull different degrees of acceleration. The degree varies in inverse proportion to the rates, thereby causing diverse parts to assume the same rapid rate of growth. Exceptions to this are parts of known dependent growth or known to require specific stimuli such as the brain.

The growth adopted under the influence of a high dose of hormone may be determined by the maximal inherent growth potential of different parts, and the degree of acceleration imparted to the rates of growth may be determined by the difference between the maximal inherent rate and the actual rates at the time of administration.

Growth hormone can overcome the arrest of skull growth caused by a systemic disturbance, such as weaning, without affecting the arrest of gain in body weight. The accelerating action of the hormone in young animals falls off more sharply than its growth-inducing action in mature animals.

Cellular proliferation of the connective tissue due to the growth hormone was evident in the frontonasal suture by increased number of mitotic figures, whereas the coronal suture showed little change.

Eruptive Movements of Lower First Molar in the Rat From 13 Days Insemination Age to 30 Days After Birth: By Cyril O'Brien, D.D.S., University of Illinois, Chicago, Ill.

This histologic study is based on frontal sections through the lower first molar region of twenty *ia* and thirty-four normal animals. The *ia* animal is characterized by an absence of incisor teeth and bone resorption. A number of fixed points are retained in the *ia* mandible permitting accurate comparisons of succeeding developmental stages. Normal and *ia* rats were compared to study the role of bone resorption during tooth eruption.

The Findings Were:

A. Tooth germ is initiated at 13 days insemination age, followed by the differentiation of ameloblasts and odontoblasts at 20 to 21 days insemination age. At 3 days after birth, enamel formation begins, 10 days after birth Hertwig's epithelial sheath appears with subsequent root formation; the erupting tooth "breaks through" the oral epithelium around 17 days after birth, and establishes functional occlusion at 23 days after birth. At 30 days, root formation is complete.

B. Tooth germ movement begins soon after initiation in a superolateral direction, maintaining a constant relationship to alveolar crests. This relationship changes at 5 days after birth in favor of the alveolar process. Beginning root formation results in rapid eruption and a lateral crown tipping associated with selective rapid bone formation on the crypt wall which ceases after functional occlusion is established.

C. Cervical loops grow deeper into the jaws for a short distance.

D. The early follicle consists of loosely arranged mesenchymal cells with abundant intercellular fluid which later changes to highly cellular structure with fusiform cells arranged parallel to the tooth surface. Soon after root formation starts, precollagenous fibers appear among the fusiform cells. The follicle is always widest inferomedially, the site from which the developing tooth migrates. When the tooth erupts into the oral cavity, organization of periodontal fibers occurs, resulting in the fibers' running from bone to slightly apical areas on the root. Establishment of functional occlusion results in a densely collagenized and considerably widened periodontal membrane.

Length of the Clinical Crowns of Teeth in Malocclusions Treated With and Without Extraction: By Robert E. Gibbs, D.D.S., University of Illinois, Chicago, Ill.

Oppenheim* concluded, after more than thirty years of histologic examination of both animal and human material, that the greatest changes brought about by orthodontic tooth movement occurred at the alveolar crest. These changes resulted in the reduction of height of the alveolar crest, followed by gingival recession and exposure of the root. This gingival recession would increase the clinical crown heights and give us a yardstick by which to measure tissue damage.

The material for study was based on measurements of the clinical crowns obtained from plaster models of thirty-one orthodontic cases in which extraction was performed as a therapeutic measure, and on thirty-one orthodontic cases in which no extraction was performed. Models of each case were obtained at the start of orthodontic treatment and from six months to seven years after the end of active treatment. The age of the patients ranged from 10 years to 26 years at the start of orthodontic treatment.

The findings were as follows:

1. The height of the clinical crowns of orthodontically treated cases show both gain and loss.
2. There is no clinically significant difference in the gain or loss of the clinical crowns between extraction and nonextraction cases.

*Oppenheim, A.: Possibility for Physiologic Orthodontic Tooth Movement, *Am. J. Orthodontics and Oral Surg.* 30: 277-328, 1944.

News and Notes

American Association of Orthodontists

Your 1955 Vacation

FELLOW MEMBERS:

On your trip to or from San Francisco to attend our 51st Annual Session, why not plan a real vacation and sightseeing tour of our fabulous West?

En route, there are literally dozens of scenic wonders, national parks, and vacation-lands which you can visit with very little additional time and with easy stop-overs. These include geyser-filled Yellowstone Park, Glacier National Park, the Grand Tetons with their snow-capped peaks, the Grand Canyon, Bryce Canyon, colorful Zion National Park, and Hoover Dam.

California itself has scores of interesting and spectacular wonders of its own, such as our Redwood Empire with its fishing, giant redwoods, old mines, and logging ports; historic Sonoma Valley Wine Country; lofty Mt. Tamalpais and its adjacent Muir Woods; the Yosemite Valley overflowing with scenic wonders; snow-covered Mt. Shasta and volcanic Lassen Peak and its lava beds; Lake Tahoe, the world's second largest, above 6,000 feet; the historic towns of our Forty-niner Gold Country in the Sierra Nevada foothills. We could go on and on, but come and see for yourself.

If you have a yearning to visit that exciting, tropical fairyland, the Hawaiian Islands, here is your chance—just a 9¼-hour overnight plane trip.

Our Association is not sponsoring any travel tours, but your travel agency will gladly plan a delightful and long-remembered adventure for you to the West.

This rare opportunity may not occur again for many years. Why not think it over?

Reuben L. Blake, General Chairman.

Post-convention Hawaii Vacation

Do you know that after attendance at the scientific meeting of the American Association of Orthodontists in San Francisco from May 8 to May 12, 1955, you can extend your West Coast trip to include fifteen glorious vacation days in Hawaii for less than \$400.00 and be away from your office only three weeks?

You can leave home on Saturday for San Francisco, attend the annual meeting of the American Association of Orthodontists, enjoy a vacation in the Islands, and return home on the Memorial Day week end to keep your early Tuesday morning appointments. The price mentioned includes round-trip air travel, fifteen days at a first-class Waikiki hotel, complete sightseeing on the Island of Oahu, social activities, and even beach sports and all taxes.

Doctors interested in this extended vacation to Hawaii may write directly to Mr. J. D. Howard, 3124 East 14th St., Oakland 1, California. He is the official travel director of the Hawaii-California Dental Meeting and will handle all necessary details.

1955 Prize Essay Contest, American Association of Orthodontists

Eligibility.—Any member of the American Association of Orthodontists and any person affiliated with a recognized institution in the field of dentistry as a teacher, researcher, undergraduate, or graduate student shall be eligible to enter the competition.

Character of Essay.—Each essay submitted must represent an original investigation and contain some new significant material of value to the art of science of orthodontics.

Prize.—A cash prize of \$500.00 is offered for the essay judged to be the winner. The committee, however, reserves the right to omit the award if, in its judgment, none of the entries is considered to be worthy. Honorable mention will be awarded to those authors taking second and third places. The first three papers will become the property of the American Association of Orthodontists and will be published. All other essays will be returned.

Specifications.—All essays must be in English, typewritten on 8½ by 11 inch white paper, double spaced with at least 1 inch margins. Each sheet must be numbered and bound or assembled with paper fasteners in a "brief cover" so that they may be handled easily. Three complete copies of each essay, including all illustrations, tables, and bibliography must be submitted. The name and address of the author must not appear in the essay. For purpose of identification, the author's name, together with a brief biographical sketch which sets forth his or her dental and/or orthodontic training, present activity, and status (practitioner, teacher, student, research worker, etc.) should be typed on a separate sheet of paper and enclosed in a sealed envelope. The envelope should carry the title of the essay.

Presentation.—The author of the winning essay will be invited to present it at the meeting of the American Association of Orthodontists to be held at the Fairmont Hotel, San Francisco, California, the week of May 9, 1955.

Judges.—The entries will be judged by the Research Committee of the American Association of Orthodontists.

Final Submission Date.—No essay will be considered for this competition unless received in triplicate at the following address on or before Feb. 15, 1955: Dr. Alton W. Moore, Medical Dental Building, Seattle, Washington.

J. A. Salzmann, Chairman, Research Committee
American Association of Orthodontists
654 Madison Ave.
New York 21, N. Y.

American Association of Orthodontists, 1955 Research Section Meeting

Continuing the policy of recent years, the program will consist of a series of ten-minute research reports which may be presented orally or read by title only. All persons engaged in research are urged to participate in this program which will be held Wednesday afternoon, May 11, 1955, in the Fairmont Hotel, San Francisco, California.

Each participant is asked to prepare a 250-word abstract for publication in the AMERICAN JOURNAL OF ORTHODONTICS. Abstract for publication and the ten-minute oral presentation at the meeting should be carefully prepared to present an adequate description of the import of your investigation.

Forms for use in submitting the title and 250-word abstract of your research will be sent to each dental school orthodontic department and to any individual requesting one. Please send your title and abstract as early as possible, but not later than March 10, 1955, to Dr. Thomas D. Speidel, University of Minnesota, School of Dentistry, Minneapolis 14, Minnesota.

J. A. Salzmann, Chairman
Research Committee
American Association of Orthodontists
654 Madison Ave.
New York 21, N. Y.

American Board of Orthodontics

The next meeting of The American Board of Orthodontics will be held at the Fairmont Hotel in San Francisco, California, May 3 through May 7, 1955. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. C. Edward Martinek, 661 Fisher Bldg., Detroit 2, Michigan.

Applications for acceptance at the San Francisco meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1955. To be eligible, an applicant must have been an active member of the American Association of Orthodontists for at least three years.

The Orthodontic Directory of the World

The seventeenth edition of the *Orthodontic Directory of the World* for 1954 has just been mailed. The edition is edited by:

Editors

Oren A. Oliver, D.D.S., LL.D.,
1915 Broadway, Nashville, Tennessee
and
William H. Oliver, D.M.D.
1915 Broadway, Nashville, Tennessee

Associate Editors

Samuel Fastlicht
Londres 85, Mexico, D.F., Mexico
Braithwaite Dixon
Medical Arts Building, Ottawa, Ontario, Canada
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José E. Uriburu, 1346, Buenos Aires, Argentina
Norman Gray
16 College Road, Eastbourne, Sussex, England
Ch. F. L. Nord
Johannes Vermeerplein 9, Amsterdam, Holland

Associate editors representing component societies of the American Association of Orthodontists are:

Philip E. Adams, Boston, Massachusetts
George Anderson, Baltimore, Maryland
Brooks Bell, Dallas, Texas
Archie B. Brusse, Denver, Colorado
Joseph D. Eby, New York, New York
James W. Ford, Chicago, Illinois
Earl G. Jones, Columbus, Ohio
E. C. Lunsford, Miami, Florida
Earl F. Lussier, San Mateo, California

The *Directory* was started seventeen years ago by the late William E. Fisher of New York. He had the thought in mind that an Orthodontic Directory of the World would serve a threefold purpose:

1. To alleviate transfer of patients who change permanent residence to another area.
2. To aid orthodontists in keeping a contact with each other through correspondence, interchange of knowledge, and renewal of friendships.
3. To attempt to furnish information concerning basic orthodontic training and qualification.

Subsequent to the death of Dr. Fisher, the *Directory* was edited by Dr. Claude Wood, former secretary and president of the American Association of Orthodontists. At the time Dr. Wood went into military service, the editing was turned over to Dr. Oren A. Oliver of Nashville, Tennessee, and it has been edited subsequently by Dr. Oliver and his son, William H. Oliver.

The *Directory* is getting to be such an important influence throughout the world that it is thought excerpts from the "Foreword" of the *Directory* may be quoted herewith; the *Directory*, which started as just a small pamphlet, now includes 217 pages.

"The editors have used all available means to make the Seventeenth Edition of the 'Orthodontic Directory of the World' as nearly correct as possible."

The editors say, "... errors may have been made, and we would appreciate your calling these to our attention so that they may be corrected in the next edition. Although every available means was used to attempt to contact all orthodontists eligible for listing, on account of changes in addresses of a number of orthodontists formerly listed, several names may have been inadvertently omitted, despite our efforts. Three information blanks were sent out to those who were formerly listed, and if they were not returned that name was omitted.

"Lack of space prevented credit for short courses being recognized, as stated in the information blanks sent out. Short courses are certainly valuable, but they do not represent basic training. It is to be presumed that nearly every practicing orthodontist has at one time or another taken one or more short courses.

"Alumni societies of schools or local or other societies not affiliated with the parent national organization are not included. Such minority group societies not affiliated with the parent national organization merely tend to weaken the orthodontic profession and consequently are not recognized in the *Directory*.

"The inclusion of any name in this *Directory* is in no way to be considered as an indorsement by the Editors or Associations. The names of those men engaged in non-exclusive practice are restricted (1) to those men in localities where there is no one in exclusive practice or (2) to those who have had adequate training and whose practice includes at least fifty per cent of the practice in exclusive practice of orthodontics or (3) to a non-exc. practitioner who is devoting more than fifty per cent of his time to the practice of orthodontics and who has been recommended for inclusion by others in the exclusive practice of orthodontics from his locality.

"The key to the *Directory* is as follows: The date immediately following the name represents the date of dental degree while the remaining data represent postgraduate instruction and dates, association in practice and dates, and membership in orthodontic societies."

The *Directory* has now grown to such demand that it is plainly a part of the library of practically every orthodontist in the world.

Necrology Committees

The following is a list of the Necrology Committees of the component societies of the American Association of Orthodontists.

This list was prepared by the chairman of the Necrology Committee of the A.A.O., at the request of the editorial staff of the AMERICAN JOURNAL OF ORTHODONTICS. It is thought that this list will be a convenient reference for the readers of the JOURNAL.

CHAIRMEN OF THE NECROLOGY COMMITTEES FOR THE COMPONENT SOCIETIES

<i>Pacific Coast Society of Orthodontists:</i>	<i>Southern Component</i>	<i>Northern Component</i>
Dr. William Smith	Dr. Calvin Gaverick	Dr. Malcom R. Chipman
450 Sutter Bldg.	Security Bldg.	Paulsen Bldg.
San Francisco, California	Long Beach, California	Spokane, Washington

The Great Lakes Society of Orthodontists:

Dr. Robert E. Ross
15819 Wyoming Ave.
Detroit 38, Michigan

Middle Atlantic Society of Orthodontists:

Dr. Augustus L. Wright
255 South 17th St.
Philadelphia, Pennsylvania

Central Section of the American Association of Orthodontists:

Dr. Charles R. Baker
636 Church St.
Evanston, Illinois

Southern Society of Orthodontists:

Dr. Thad Morrison, Sr.
Doctors Bldg.
Atlanta, Georgia

Northeastern Society of Orthodontists:

Dr. Walter H. Ellis
333 Linwood Ave.
Buffalo, New York

Rocky Mountain Society of Orthodontists:

Dr. C. L. Benight
Republic Bldg.
Denver, Colorado

Southwestern Society of Orthodontists:

Dr. John W. Richmond
New Brotherhood Bldg.
Kansas City, Kansas

PROCEDURE RE NECROLOGIES

Upon the death of a member of the A.A.O., it is desirable that the membership be informed with a minimum of delay through the AMERICAN JOURNAL OF ORTHODONTICS.

As the Necrology Committee of the A.A.O. is a rotating committee with the tenure of office of the chairman usually of one year's duration, the adoption of a uniform procedure is essential and will be facilitated by a close coordination of the efforts of the members, the chairman of the Necrology Committee of each component society, and the chairman of the Necrology Committee of the A.A.O. in the accomplishment of this objective.

Members.—As soon as a member of the A.A.O. learns of the death of another member, he should report it promptly to the chairman of the Necrology Committee of the component society or other individual designated to prepare the necrology. (A letter stating available factual data will be of great assistance.)

Component Societies.—All component societies have a standing committee on necrology whose duty, as the necessity arises, is to prepare a suitable necrology which is read before the society and to forward a copy to a close relative of the deceased member. Whether prepared as a formal resolution or as a simple tribute, this necrology is a fitting recognition of the death of a member. If two additional copies of the necrology are forwarded to the chairman of the Necrology Committee of the A.A.O. and one to the secretary of the A.A.O., these persons will be currently informed.

A.A.O.—When the two copies of the necrology are received by the chairman of the Necrology Committee of the A.A.O., one is forwarded to the editor of the AMERICAN JOURNAL OF ORTHODONTICS and the other is retained for the files of the committee for inclusion in the annual report of the chairman to the Board of Directors of the American

Association of Orthodontists. It is desirable that the secretary of the A.A.O. be informed to enable him to prepare a complete list of deceased members for the program of the annual meeting.

Necrology Committee, American Association of Orthodontists

G. V. Fisk

G. H. Herbert

Wm. S. Smith

Northeastern Society of Orthodontists

The Northeastern (formerly New York) Society of Orthodontists held its Fall Meeting Oct. 25 and 26, 1954, at the Hotel Statler, Buffalo, New York. The program follows:

Monday Morning

A Case Report.

Warren R. Mayne, D.D.S., M.S.D., Salem, Massachusetts.

Extraoral Appliances—Facts and Fallacies.

T. M. Graber, D.D.S., Chicago, Illinois.

Human Head and Figures.

Prof. Wilfred I. Duphiney, Providence, Rhode Island.

On the Relative Importance of Genetic & Nongenetic Factors to the Profile of the Facial Skeleton (Based on Twin-investigation).

Prof. Anders Lundstrom, Stockholm, Sweden.

Monday Afternoon

A Rationale for Closer Cooperation Between the Orthodontist and the Speech and Hearing Therapist.

Barnett Frank, D.D.S., Rochester, New York.

Problems and Limitations of Cephalometric Analysis.

T. M. Graber, D.D.S., Chicago, Illinois.

Correction of Mandibular Prognathism by Bilateral Osteotomy.

Bernard G. Wakefield, D.D.S., Buffalo, New York.

Tuesday Morning

An Analysis of Changes in the Dentofacial Skeleton Following Orthodontic Treatment.

Coenraad F. A. Moorrees, D.D.S., Boston, Massachusetts.

The Correlation Between Size of Teeth and Relative Archspacing.

Prof. Anders Lundstrom, Stockholm, Sweden.

Diagnosis and Treatment—Occipital Anchorage.

Walter Mosmann, D.D.S., Hackensack, New Jersey.

Analysis of Orthodontic Deformity Employing Lateral Cephalostatic Radiography.

Harvey Jenkins, B.D.Sc., D.D.S., Toronto, Canada.

Your President Reports.

Dr. Frederick T. West, President of A.A.O., San Francisco, California.

The officers elected for the following year were: president, Eugene J. Kelly, Trenton, New Jersey; vice-president, Clifford G. Glaser, Buffalo, New York; director, Dr. Norman L. Hillyer, Hempstead, N. Y.; alternate, Dr. Richard A. Lowy, Chatham, N. Y.

Re-elected were: Dr. Brainerd Swain, editor, Morristown, N. J.; sectional editor, Dr. Joseph D. Eby of New York City; secretary-treasurer, Dr. Wilbur J. Prezzano of White Plains, N. Y.

The next meeting of the Northeastern Society of Orthodontists will be held at the Hotel Commodore, New York, N. Y., on Monday and Tuesday, March 7 and 8, 1955.

Rocky Mountain Society of Orthodontists

The annual fall meeting of the Rocky Mountain Society of Orthodontists was held Nov. 15 and 16, 1954, at Denver, Colorado.

The program follows:

Monday, Nov. 15, 1954

Dr. H. K. Terry. The Versatility of Labiolingual With Effective Variations.

1. The Occlusal Guide Plane
2. Construction Use and Effect
3. Early Treatment
4. Centric Relation and the Orthodontist
5. Practical Steps for Occasional Problems

(Dr. Charles Sleichter of Iowa City, Iowa, formerly with the National Institute of Dental Research, appeared with Dr. Terry.)

Dr. Frank T. Joyce. Allergy and Orthodontics.

1. The Mechanism of Allergy
2. The Relation of Nasal Allergies to Orthodontics
3. The Method of Discovering the Allergies
4. How the Allergist Can Help

Tuesday, Nov. 16, 1954

Dr. H. K. Terry.

Member Participation Clinic.

Dr. H. K. Terry.

Luncheon Denver Press Club.

Dr. H. K. Terry.

Southern Society of Orthodontists

The thirty-third annual session of the Southern Society of Orthodontists was held Oct. 31 through Nov. 3, 1954, at the Mayflower Hotel in Washington, D. C. A brief résumé of the meeting follows.

Sunday, October 31

Golf tournament at Goose Creek Golf and Country Club.

Buffet supper in the Williamsburg Room of the Mayflower Hotel.

Address. Dr. George Heaton, pastor of Myers Park Baptist Church, Charlotte, N. C.

Monday, November 1

Breakfast meeting of the Executive Board.

Invocation. Dr. Luther D. Miller, Canon, The National Cathedral, Washington, D. C.

Welcoming Address. Daniel Lynch, President-Elect, American Dental Association.

Response. Amos Bumgardner, Charlotte, N. C.

Presidential Address. Leigh C. Fairbank, Washington, D. C.

Past Presidents' Luncheon.

A Philosophy of Orthodontic Therapy Based on the Individual Norm Concept. John R. Thompson, Chicago, Ill.

Esthetics of the Face. John R. Thompson, Chicago, Ill.

Abnormal Function of the Masticating System. John R. Thompson, Chicago, Ill.

The Forward Drift of Teeth During Growth. Alexander Sved, New York, N. Y.

Principles and Methods of Treatment. L. Bodine, Higley, Chapel Hill, N. C.

Panel Discussion. Public Relations as It Is Affected by the Handling of Emergency Treatments and Transfer of Patients. Herbert D. Jaynes, Atlanta, Ga., moderator.

Tuesday, November 2

The Occlusal Guide Plane, a Cephalometric Appraisal of Treatment Changes. William Brandhorst, St. Louis, Mo.

Business Meeting.

Forum Discussion. William Brandhorst, L. Bodine Higley, Alexander Sved, John R. Thompson, and John A. Atkinson, moderator.

Table Clinics:

The Hi-Lo Lingual Arch Used in Cases Requiring First Bicuspid Extractions. Lyman E. Wagers, Lexington, Ky.

Adult Orthodontics. Marvin Goldstein, Atlanta, Ga.

Appliances For Depressing Lower Anterior Teeth. W. Penn Marshall, Jr., Raleigh, N. C.

Retainers in One Day. Daniel B. Lewis, Owensboro, Ky.

A Mutilated Class III Type Case of Malocclusion With an Extremely Deep Bite. Lewis L. Brown, Charlottesville, Va.

Aids to Assist the General Practitioner in Referring Orthodontic Patients. James Brousseau, Baton Rouge, La.

Early Treatment of Class II Using Cervical Anchorage. R. Burke Coomer, Louisville, Ky.

Basic Principles of the Labio-Lingual Technique Often Overlooked. Thomas D. Pryse, Knoxville, Tenn.

Adult Orthodontics, Major and Minor Compromises. E. C. Lunsford, H. K. Terry, and R. B. Clark, Miami, Fla.

Graduate Orthodontics at the University of Tennessee. Faustin N. Weber, Ralph E. Braden, Walter C. Sandusky, and Robert F. Taylor, Memphis, Tenn.

Graduate Orthodontics at Emory University School of Dentistry. Frank F. Lamons, Wendell Taylor, and Joe Meadows, Atlanta, Ga.

Orthodontic Program at the University of Alabama School of Dentistry. Boyd W. Tarpley and James McCabe, Birmingham, Ala., and Charles R. Crook, Montgomery, Ala.

President's Ball and Dance. (Visited briefly by President and Mrs. Eisenhower.)

*Wednesday, November 3***Final Business Meeting.**

Presentation of Past President's pin by Walter T. McFall to retiring president, Leigh C. Fairbank.

Installation of newly elected officers and committees.

The following officers were elected for the coming year:

President	Olin W. Owen, Charlotte, N. C.
President-Elect	William M. Jarrett, Charleston, W. Va.
Vice-President	William D. Curtis, Washington, D. C.
Secretary-Treasurer	M. D. Edwards, Selma, Ala.
Assistant Secretary-Treasurer	H. K. Terry, Miami, Fla.
Directors	Frank P. Bowyer, Jr., Knoxville, Tenn.
	John A. Atkinson, Louisville, Ky.
	H. Harvey Payne, Atlanta, Ga.

Charles R. Baker Honored by Chicago Association of Orthodontists

On Monday evening, Oct. 25, 1954, the Chicago Association of Orthodontists tendered Dr. Charles R. Baker a testimonial dinner. Dr. Baker was honored for his predominant role as one of the charter members of the Association, which was formed in 1925.

Dr. William A. Murray was the toastmaster and the speakers included Dr. Charles W. Freeman, Dr. Max Ernst, and Dr. Ernest Bach.

Johnson Alumni Club

The Johnson Alumni meeting will be held at the Brown Hotel in Louisville, Kentucky, Jan. 30 through Feb. 2, 1955.

University of Illinois

The University of Illinois College of Dentistry is presenting a one-day television course especially for members of the American Association of Orthodontists on Sunday, Feb. 6, 1955.

The course will be given under the direction of Dr. William Downs, Professor of Orthodontics.

Additional information may be secured from the University of Illinois College of Dentistry, Chicago, Illinois.

Tufts College Dental School

The following orthodontic courses will be offered at Tufts College Dental School during the 1954-55 academic year.

DPG. 401—Orthodontics.

Each Wednesday for eight weeks from Feb. 9 to March 30, 1955.

Dr. Herbert Margolis and Staff.

DPG. 402—Cephalographies and Diagnosis.

Monday, Tuesday, and Wednesday, March 21, 22, 23, 1955.

Dr. Herbert Margolis and Staff.

Northwestern University

On Feb. 21, 22, and 23, 1955, the Graduate Department of Orthodontics of Northwestern University Dental School will present a basic course in cephalometric radiography. The course is planned for orthodontists who have not had any previous training in cephalometric radiography.

For information, write to the Director of Post Graduate Study, Northwestern University Dental School, 311 E. Chicago Ave., Chicago 11, Illinois.

University of Bombay Nair Hospital Dental College

The Nair Hospital Dental College has been affiliated with the University of Bombay for a B.D.S. degree course since June, 1954. Admissions have accordingly been made to the first B.D.S. class this year. A candidate who has passed the intermediate examination in science of the University of Bombay (a two years' course which is equivalent to a two years' pre-dental course in the United States and Canadian dental colleges) or an examination of another university or body recognized as equivalent thereto is eligible for admission to the course.

Advisory Council on Reserve Affairs Established for Army Medical Service

Organization of a council of five general officers from the Army Medical Corps Reserve to advise the Surgeon General on matters related to the Medical Reserve matters was announced on Nov. 1, 1954, by the Department of the Army.

Major General George E. Armstrong, the Surgeon General of the Army, welcomed the officers invited to form the council at the initial session held Monday, October 25, at his office. He declared their advice would be sought on special reserve items having far-reaching impact on the health professions of the nation, as well as on those problems concerning the general activities of the Army's Medical Reserve.

The council members, all of whom were present at this first meeting, include: Brigadier General, Perrin H. Long, College of Medicine, State University of New York; Brigadier General, Alexander Marble, Joslin Clinic, Boston, Massachusetts; Brigadier General, I. S. Ravdin, Professor of Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania; Brigadier General, Harold G. Scheie, Assistant Professor of Ophthalmology, University of Pennsylvania Graduate School, Philadelphia, Pennsylvania; and Brigadier General, Frank E. Wilson, Director of the Washington Office of the American Medical Association.

Also attending were Major General Silas B. Hays, Deputy Surgeon General of the Army; Colonel James B. Mason, Special Assistant to the Surgeon General for Reserve Forces; and Colonel Charles L. Leedham, Chief of the Education and Training Division, Office of the Surgeon General.

Meetings of the council are scheduled to be held in the spring and fall of each year, the scope of such conferences to range from procurement of Reserve personnel to the utilization of professional reserves. The advisory group will make suggestions, too, for promoting a closer relationship between military and civilian medicine with a view to increasing the strength of the Army Medical Service Reserve.

Notes of Interest

Roy J. Bourquin, B.S., D.D.S., has removed his part-time orthodontic practice in Beverly Hills, California, where he was associated with Dr. Dallas R. McCauley, to 213 Anglo Calif. Bank Bldg., Chico, California, where he is associated with Dr. Homer A. Dahlman in the exclusive practice of orthodontics.

Dr. Neil C. Farrell announces the removal of his Dayton View office for the exclusive practice of orthodontics from Room 360, Medical Arts Bldg., to Suite 240, Medical Arts Bldg., 627 Salem Ave., Dayton, Ohio. (Oakwood office: 2301 Far Hills Ave., Dayton, Ohio.)

Louis S. Miller, D.D.S., wishes to announce the limiting of his practice to orthodontics, Professional Bldg., Suite 14, 60 South 4th East, Salt Lake City, Utah.

Harry Wormington, D.D.S., M.S.D., Professional Bldg., 722 Penn Ave., Wilkinsburg, Pgh. 21, Pa., is in the *exclusive* practice of orthodontics and not in the nonexclusive practice as listed in the *Orthodontic Directory of the World*.

Dr. Glenn F. Young announces the removal of his office to 41 Park Ave., New York, N. Y., practice limited to orthodontics.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

American Association of Orthodontists

President, Frederick T. West - - - - - 760 Market St., San Francisco, Calif.
President-Elect, Philip E. Adams - - - - - 106 Marlborough St., Boston, Mass.
Vice-President, George H. Herbert - - - - - 7002 Pershing Ave., St. Louis, Mo.
Secretary-Treasurer, Franklin A. Squires - - - - - Medical Centre, White Plains, N. Y.

Central Section of the American Association of Orthodontists

President, Howard Yost - - - - - W. Division St., Grand Island, Neb.
Secretary-Treasurer, Frederick B. Lehman - - - - - 1126 Merchants Bank Bldg.,
 Cedar Rapids, Iowa

Great Lakes Society of Orthodontists

President, Carl R. Anderson - - - - - 402 Loraine Bldg., Grand Rapids, Mich.
Vice-President, Fred Aldrich - - - - - 327 E. State St., Columbus, Ohio
Secretary, Hunter I. Miller - - - - - 1416 Mott Foundation Bldg., Flint, Mich.
Treasurer, George S. Harris - - - - - 18520 Grand River, Detroit, Mich.

Middle Atlantic Society of Orthodontists

President, B. Edwin Erikson - - - - - 3726 Connecticut Ave., N.W., Washington, D. C.
Vice-President, Aubrey Sager - - - - - Medical Arts Bldg., Philadelphia, Pa.
Secretary-Treasurer, Paul Deems - - - - - 835 Park Ave., Baltimore, Md.

Northeastern Society of Orthodontists

President, Eugene J. Kelly - - - - - 455 W. State St., Trenton, N. J.
Vice-President, Clifford G. Glaser - - - - - 1255 Delaware Ave., Buffalo, N. Y.
Secretary-Treasurer, Wilbur J. Prezzano - - - - - Medical Centre, White Plains, N. Y.

Pacific Coast Society of Orthodontists

President, Arnold E. Stoller - - - - - Medical Dental Bldg., Seattle, Wash.
Secretary-Treasurer, Raymond M. Curtner - - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, Walter K. Appel - - - - - 4018 Moore Ave., Cheyenne, Wyo.
Vice-President, R. E. Harshman - - - - - 2402 Broadway, Scotts Bluff, Neb.
Secretary-Treasurer, Howard L. Wilson - - - - - Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, Olin W. Owen - - - - - Liberty Life Bldg., Charlotte, N. C.
Vice-President, William D. Curtis - - - - - 1726 Eye St., N.W., Washington, D. C.
Secretary-Treasurer, M. D. Edwards - - - - - 132 Adams St., Montgomery, Ala.

Southwestern Society of Orthodontists

President, J. Victor Benton - - - - - 1206 Union Nat'l Bank Bldg., Wichita, Kan.
Vice-President, Tom M. Williams - - - - - 612 Medical Arts Bldg., Dallas, Texas
Secretary-Treasurer, Harold S. Born - - - - - 908 Johnstone, Bartlesville, Okla.

American Board of Orthodontics

<i>President</i> , Raymond L. Webster	- - - - -	133 Waterman St., Providence, R. I.
<i>Vice-President</i> , Ernest L. Johnson	- - - - -	450 Sutter St., San Francisco, Calif.
<i>Secretary</i> , G. Edward Martinek	- - - - -	661 Fisher Bldg., Detroit 2, Mich.
<i>Treasurer</i> , Lowrie J. Porter	- - - - -	41 East 57th St., New York, N. Y.
<i>Director</i> , William R. Humphrey	- - - - -	Republic Bldg., Denver, Colo.
<i>Director</i> , L. Bodine Higley	- - - - -	University of North Carolina, Chapel Hill, N. C.
<i>Director</i> , Wendell L. Wylie	- - - - -	University of California, San Francisco, Calif.

A List of the Orthodontic Societies of the World and Their Principal Officers***Chicago Association of Orthodontists**

<i>President</i> , John R. Thompson	- - - - -	55 E. Washington St., Chicago, Ill.
<i>President-Elect</i> , Leonard Grimson	- - - - -	636 Church St., Evanston, Ill.
<i>Secretary-Treasurer</i> , G. L. Christopher	- - - - -	9504 S. Hamilton, Chicago, Ill.

Orthodontic Alumni Society of Columbia University

<i>President</i> , David Dragiff	- - - - -	20 East 53rd St., New York, N. Y.
<i>Vice-President</i> , Robert C. Sturtevant	- - - - -	88-23 184th St., Jamaica, N. Y.
<i>Treasurer</i> , Henry P. Levy	- - - - -	8522 5th Ave., Brooklyn, N. Y.
<i>Secretary</i> , Richard Pasternak	- - - - -	30 W. 59th St., New York, N. Y.

Harvard Society of Orthodontists

<i>President</i> , Bernard C. Rogell	- - - - -	6 Pleasant St., Malden, Mass.
<i>Vice-President</i> , Ben Wayburn	- - - - -	67 Coddington St., Quincy, Mass.
<i>Secretary</i> , Milton J. Meyers	- - - - -	281 Haverhill St., Lawrence, Mass.
<i>Treasurer</i> , Clifford G. Hunt	- - - - -	14 Muzzey St., Lexington, Mass.

New York Society for the Study of Orthodontics

<i>President</i> , A. D. Mollin	- - - - -	260 Middleneck Road, Great Neck, Long Island, N. Y.
<i>Vice-President</i> , Leon M. Gecker	- - - - -	305 West 72nd St., New York, N. Y.
<i>Secretary</i> , Nathan Sachs	- - - - -	84-75 168th St., Jamaica, Long Island, N. Y.
<i>Treasurer</i> , Irving Lederman	- - - - -	45-54 41st St., Long Island City, N. Y.

New York University Orthodontic Society

<i>President</i> , Harry Feinberg	- - - - -	408 Jay St., Brooklyn, N. Y.
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*In the January issue of the AMERICAN JOURNAL OF ORTHODONTICS is published each year a list of the orthodontic societies of the world of which the JOURNAL has any record, along with the names and addresses of their principal officers.

The JOURNAL keeps a file for each of these societies and publishes the names that appear in that file as of the date of going to press.

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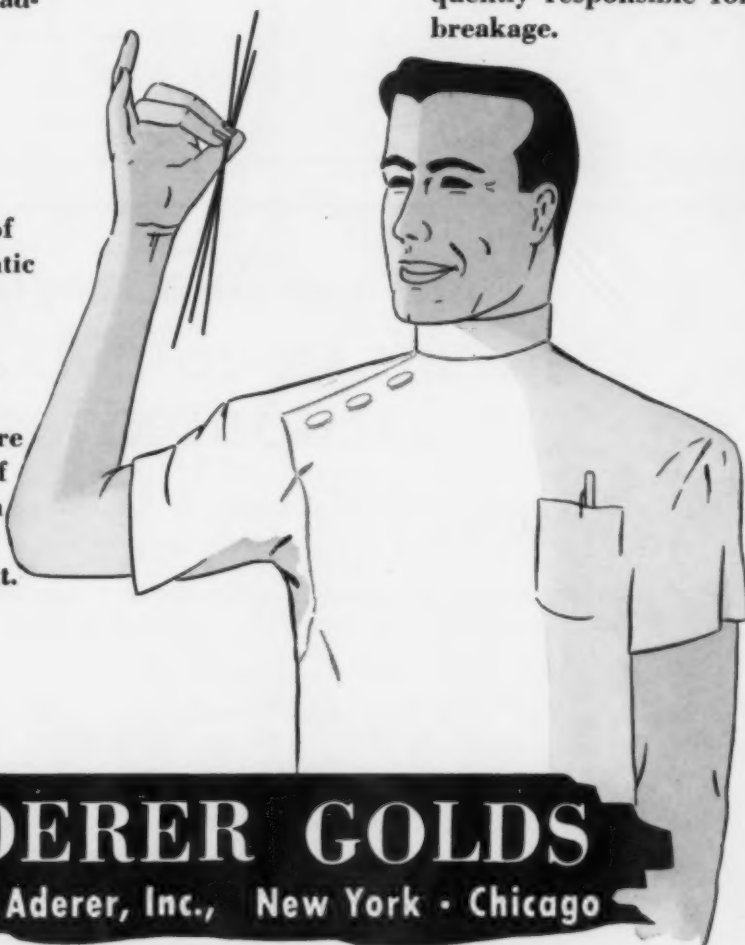
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